



# Integrating Electrical Trainers into a Secondary Automotive Program

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- Automotive is increasing in complexity every day, Because of Computers
- Dealers are finding it difficult to find technicians that understand Electrical
- Federal guidelines on teaching Auto is very complex and subjective
- Teaching any subject requires a multifaceted approach and understanding to be effective
- Teaching auto is extra challenging due to student body and lack of qualified instructors

- Teaching electrical to high school auto students is a great challenge
- The “old” way might not be the “best” way
- Administrators want proof before spending funds
- Teaching electrical more efficiently leads to more activities and more learn and therefore, hopefully better trained students leading to rewarding careers

The slide features a dark blue background with white decorative circuit board patterns in the corners. The patterns consist of thin white lines forming various shapes and paths, with small white circles at the end of the lines, resembling a PCB layout. A small yellow speech bubble icon is visible in the top-left corner.

The purpose of the project is to...

Identify the benefits and costs associated with integrating electrical trainers into a secondary automotive program



**Phase 1**: Identify the types and uses of electrical trainers in CTE secondary programs

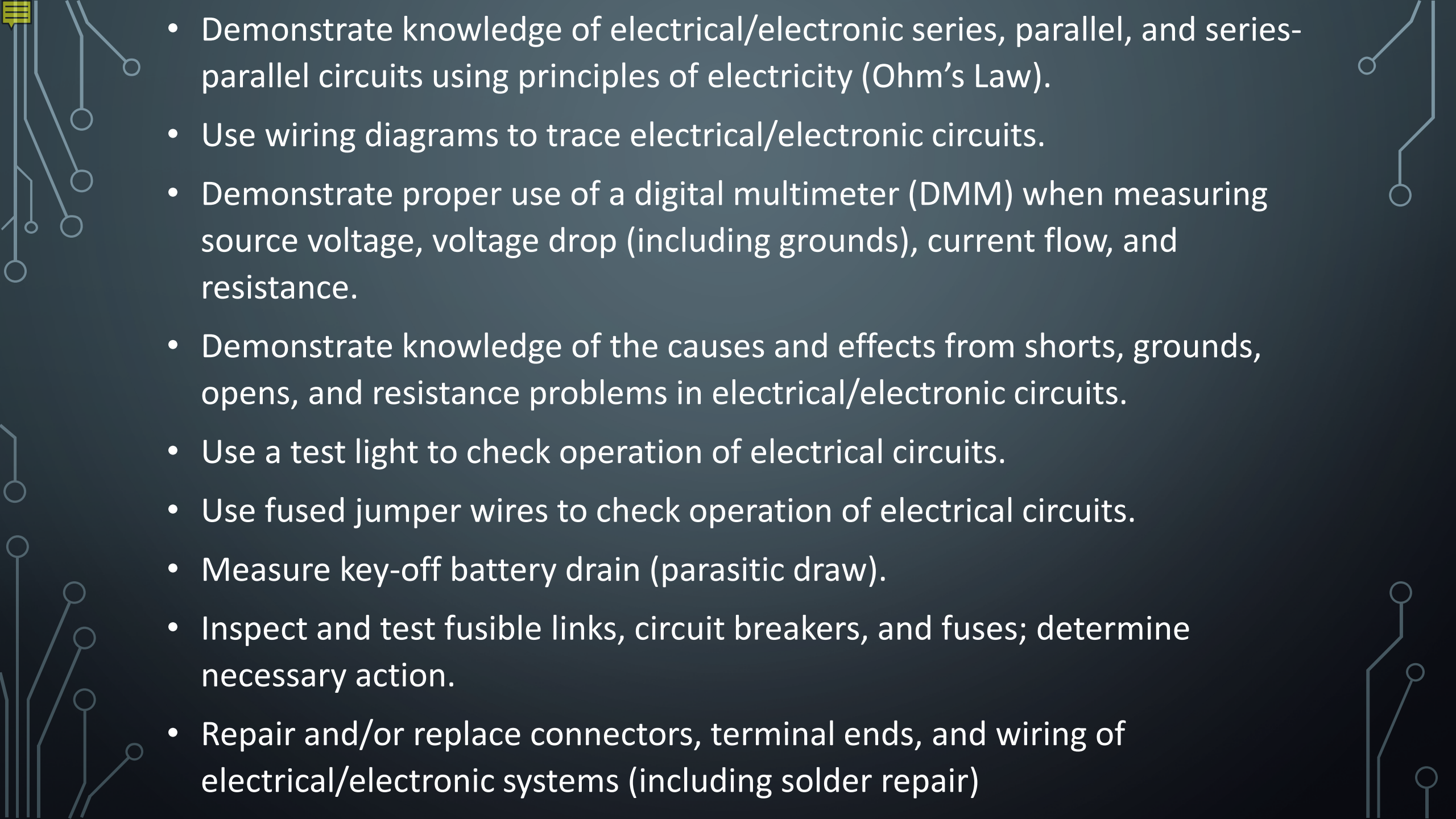
**Phase 2**: Identify “best practices” with using electrical trainers

**Phase 3**: Identify pros/cons when using electrical trainers

**Phase 4**: Identify potential funding sources for trainers



- Vocational education in public schools
- Michigan Top 10 in 10
- National Career Clusters
- CIP 47.0604
- ASE Education Foundation (NATEF)

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- Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).
  - Use wiring diagrams to trace electrical/electronic circuits.
  - Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance.
  - Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.
  - Use a test light to check operation of electrical circuits.
  - Use fused jumper wires to check operation of electrical circuits.
  - Measure key-off battery drain (parasitic draw).
  - Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
  - Repair and/or replace connectors, terminal ends, and wiring of electrical/electronic systems (including solder repair)

- Pennsylvania Department of Education
- US Navy
- Understanding Troubleshooting Styles
- Curriculum Development in Vocational and Technical Education



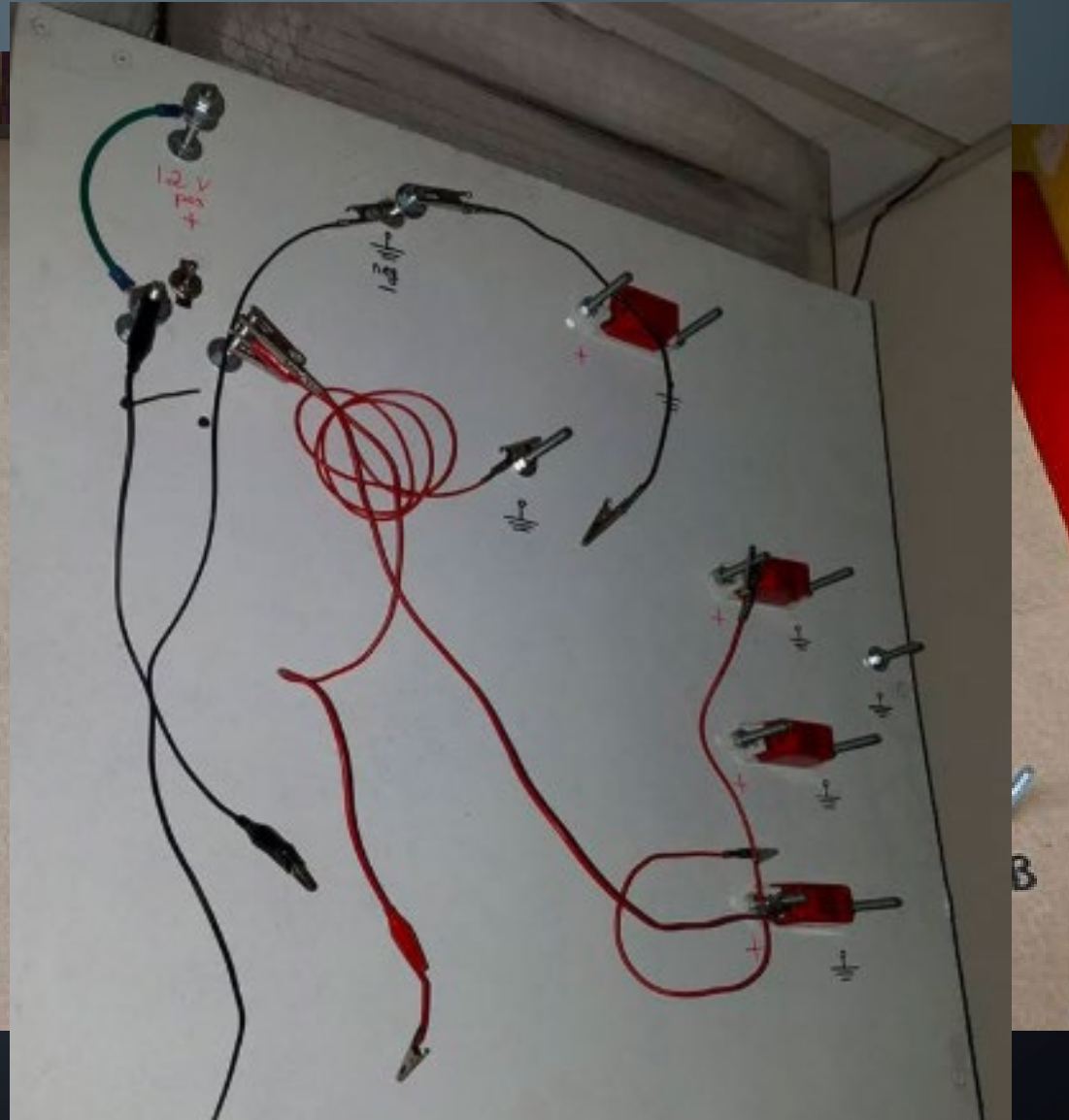
- Telling Ain't Training
- Learning to Troubleshoot
- Kinesthetic Learners
- Practice, Practice, Practice

- Phase 1: Identify the types of electrical trainers
- Phase 2: Identify the best practices
- Phase 3: Pros and Cons
- Phase 4: Identify potential funding

## ➤ Old way vs. New way



# ➤ Old way vs. New way



## Chapter 4 - ATech



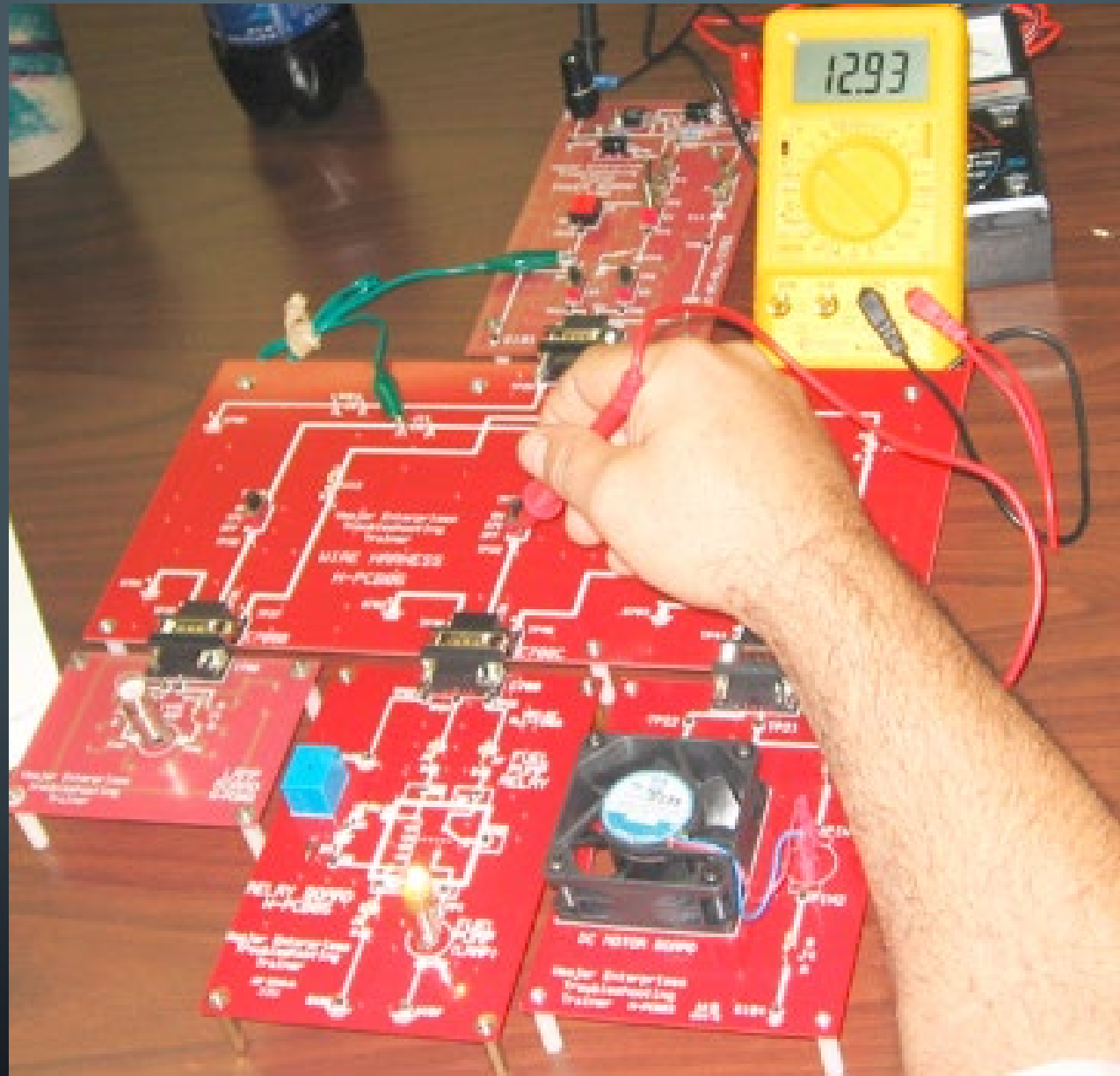
## Chapter 4 - ConsuLab



## Chapter 4 Lucas-Nuelle



## Chapter 4 - Veejer

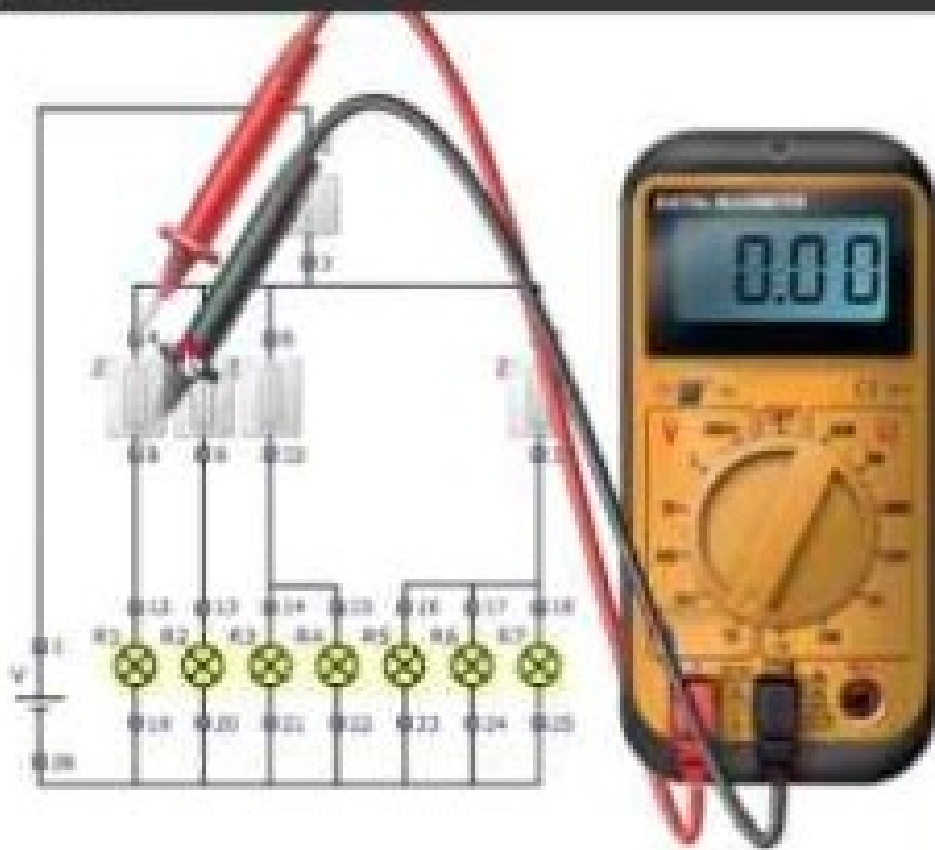




# Chapter 4 - Electude

## Ammeter

## ELECTUDE



### NOTE:

Because electricity always seeks the path of least resistance, it's possible to create a short circuit with an ammeter. This is because, when the meter is set to measure current, it has a low internal resistance. Therefore, if you accidentally connect the ammeter in parallel to the load, current will bypass through the meter, potentially overloading the meter's fuse.

You can measure current by placing the meter in series with the load. For example, by removing a fuse and connecting the meter in its place.

- R1- parking light left
- R2- parking light right
- R3- tail light left
- R4- tail light right
- R5- dashboard lighting
- R6- dashboard lighting
- R7- dashboard lighting



Use the meter to measure current through one parking light.

You can disconnect the fuses in the diagram by clicking on a fuse with the left mouse button.

The current through one parking light is...

- 1 A
- 10 V
- 2 V
- 1 A

- 1.) There are a LOT of vendors out there selling trainers and simulators. Instructors need to research what “works” best for their classroom
- 2.) Federal and State funds CAN be used for trainers but instructors and administrators need to get creative
- 3.) Need more research because passion and belief are not enough