

eet103

NMC EET103 Electrical Studies I

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EET103 Electrical Studies I

EET103 - Labs - Series Circuits

Name _____

Partner _____

Objectives:

- Wire a series circuit using a breadboard and three resistors.
- Interpret and follow a circuit schematic to populate a breadboard.
- Confirm resistor values using the DMM.
- Measure resistance, voltage, and current using the DMM.

Materials:

- Digital multimeter (DMM)
- Breadboard
- Resistors (3 different values)
- Power supply (Breadboard power supply module)
- Test leads
- EveryCircuit account (link and license key provided)

Procedure

This lab will be completed with a partner. However, each student will create their own video presentation, demonstrating the procedures and results.

Part 1 - Series Circuit Simulation

1. **Investigate Resistors in Series:** Simulate a DC circuit with three resistors connected in series using the EveryCircuit simulator.

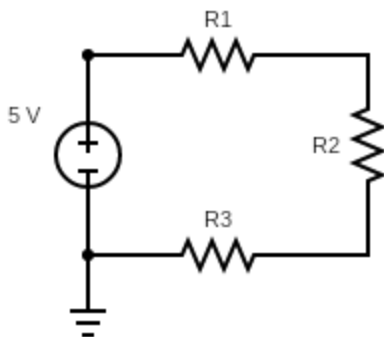
2. **Select Resistors:** Choose three resistors from your kit with different values but similar ranges (e.g., 100Ω , 220Ω , and 330Ω).

3. **Create an EveryCircuit Account:**

- Use the following link and license key to create your account:
 - <https://everycircuit.com/licensekeyactivation>
 - License key: 384186293328
 - Simulator available at: <https://everycircuit.com/app>
 - Note: The account will expire at the end of this course.

4. **Build the Circuit in EveryCircuit:**

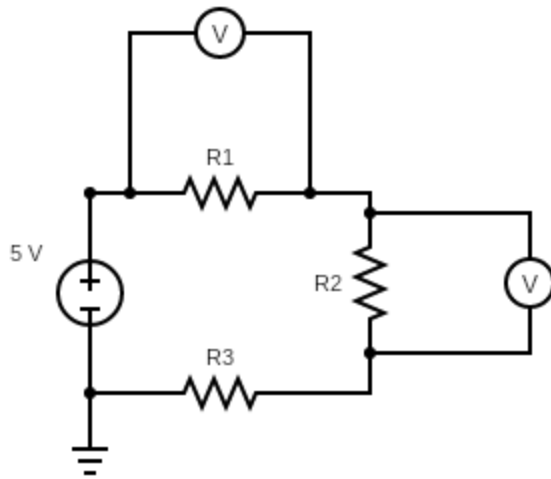
- Use the components in the toolbar to create the series circuit shown below. Be sure you and your partner use the same resistors in the same locations in the circuit.
- Add wires by clicking on terminals and dragging them to connect components.
- Use the wrench icon to adjust the resistor values.
- Ensure the ground symbol is included for proper simulation.



5. **Simulate Circuit Operation:**

- Press the space bar to run the simulation and observe current flow and voltage levels.
- Use the pause and rewind buttons to stop and edit the circuit.

6. **Add Voltmeters:** Add voltmeters across R1 and R2 as shown below to observe the voltage drops.

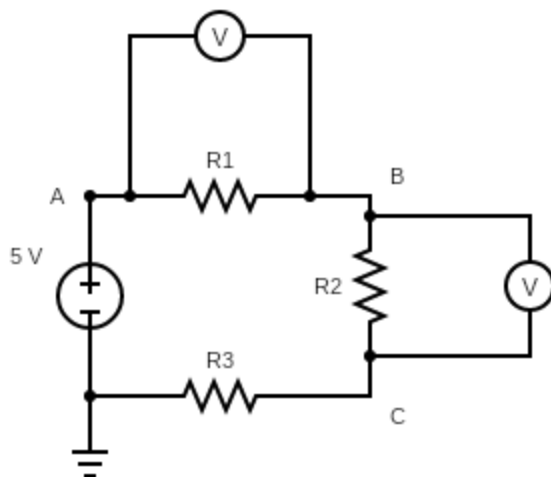


7. **Record Simulation Results:** Document the voltage drop and current in the table below.

Component	Value	Voltage Drop	Current
R1			
R2			
R3			

1. **Subscript Variables and Measurements:**

- Understand voltage measurement using subscripts (e.g., V_A for voltage at point A). For V_{BC} , place the common lead at point C and the red lead at point B.
- Use the test points A, B, and C in the circuit diagram below to complete the table.



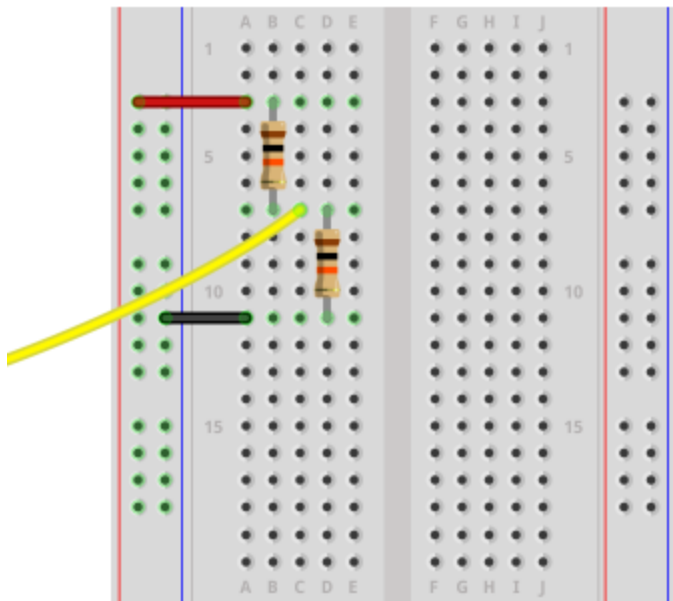
Voltage Variable	Value (V)
V_A	
V_B	
V_C	
V_{AB}	
V_{BC}	
V_{AC}	
V_{CB}	

Part 2 - Series Circuit Construction and Measurement

- Inspect Resistors:** Examine the three resistors selected in Part 1.
 - Record their nominal values.
 - Use an AI prompt or manual reference to determine the color code for each resistor.
 - Measure the actual resistance using the DMM.

Component	Nominal Value	Color Code	Measured Value
R1			
R2			
R3			

- Breadboard Overview:**
 - Watch the video on breadboard usage: [How to Use a Breadboard](#)
 - Watch the video on using the breadboard power supply module: [Using an MB-102 Breadboard Power Supply Module](#)
- Construct the Series Circuit:**
 - Work with your partner to build the series circuit from Part 1 on a breadboard. Refer to the schematic and plan component layout carefully.



3. **Validate Circuit Build:** Have your partner verify your circuit construction before applying power.

4. **Energize and Measure:**

- Use the DMM to measure the circuit's current and the voltage drop across each resistor. Remember to measure current in series and voltage in parallel.

5. **Record Your Results:**

Component	Value	Voltage Drop	Current
R1			
R2			
R3			

Assessment

1. **Video Demonstration:**

- Create a video summarizing your lab activity. Include the following points:
 - Resistor selection and schematic overview.
 - Simulation results from Part 1 (screen-sharing the EveryCircuit app is encouraged).
 - Breadboard circuit build and description of voltage source and current flow.
 - Discussion of your measurements from Part 2, comparing them to the simulation results. Show this document with values entered.

- Challenges encountered during the lab and lessons learned.

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