1.1 - Series and Parallel Circuits

Series and parallel circuit activity

1. Choose any two resistors from your kit of parts. Measure each resistor and then calculate the total series resistance and the total parallel resistance of the two resistors:

   R1 = R2 =

   $R_{Tseries}$ = $R_{Tparallel}$ =

2. Draw a schematic diagram showing the two resistors connected in series to a 6 V power supply. Build the circuit on a breadboard and measure each of the following potentials:

   V_T =

   V_{R1} =

   V_{R2} =

3. **Calculate** the total current flow (using the measured potential and resistances).

   I_T =

4. **Measure** the total current flow using a multimeter.

   I_T =

5. Draw a schematic diagram showing the same two resistors connected in parallel to a 6 V power supply. Build the circuit on a breadboard and measure each of the following potentials:

   V_T =

   V_{R1} =

   V_{R2} =

6. **Calculate** the total current flow (using the measured potential and resistances).

   I_T =

7. **Measure** the current flow in each parallel branch by isolating the resistors and measuring each current. How close are the sum of these two currents to the total circuit current you calculated?

I_{R1} = I_{R2} =

Teacher Check ☐

Circuit analysis

8. Pick another resistor from your parts and re-draw the series circuit so it now includes the three resistors. Measure its value. Next, predict how the potential drop of each series resistor will change (circle the predicted change) when the third resistor is added to your circuit, and then calculate the expected circuit parameters. Do they match your predictions?

R3 value =	R_T =
R_T higher/lower/same	I_T =
I_T higher/lower /same	V_{R1} =
E_{R1} higher/lower/same	V_{R2} =
E_{R2} higher/lower/same	V_{R3} =

9. Re-draw the parallel circuit, including a third resistor in parallel with the other two resistors in the parallel circuit. Predict how the current flow through each parallel resistor will change when the third resistor is added to the circuit, and then calculate the expected circuit parameters. Do they match your predictions?

R3 value =	R_T =
R_T higher/lower/same	I_T =
I_T higher/lower/same	I_{R1} =
I_{R1} higher/lower/same	I_{R2} =
I_{R2} higher/lower/same	I_{R3} =