

Series & Parallel Circuit Simulator

Classroom worksheet · Interactive simulation: <https://lkforge.com/tools/physics/circuit-simulator/>

Name: _____ Date: _____

Learning objectives

- Compute equivalent resistance for series and parallel resistors.
- Apply Ohm's law to find current and voltage.
- Contrast how current and voltage divide in each configuration.

Variables to change

- Resistor values
- Series/parallel arrangement
- Supply voltage

Procedure

1. Build two resistors in series and note the total resistance and current.
2. Rebuild them in parallel and compare the total resistance and current.
3. Change one resistor value and observe the effect in each case.

Observations

Record total resistance, total current, and the voltage or current across each resistor.

Questions

1. How do you find total resistance in series? In parallel?
2. Is the equivalent resistance of parallel resistors larger or smaller than the smallest one?

3. In a series circuit, what is the same through every resistor?
4. In a parallel circuit, what is the same across every branch?
5. State Ohm's law.

Answer key (instructors)

- **1.** Series: $R = R_1 + R_2 + \dots$ Parallel: $1/R = 1/R_1 + 1/R_2 + \dots$
- **2.** Smaller — adding parallel paths always lowers total resistance.
- **3.** The current is the same everywhere; the voltage divides among them.
- **4.** The voltage is the same across each branch; the current divides.
- **5.** $V = I \cdot R$.

Series resistances add and share one current while splitting voltage; parallel resistances combine reciprocally (total below the smallest) and share one voltage while splitting current. Ohm's law $V = IR$ ties them together.