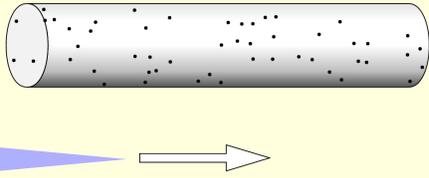


In **Resistance in a Wire**, students explore how changing the resistivity, length, and area of a wire affects its resistance.

OBSERVE how the size of the variable corresponds to its value

$$R = \frac{\rho L}{A}$$


MEASURE the resistance as ρ , L , and A change

NOTICE the direction of the current

resistance = 0.63 ohm

ρ resistivity	L length	A area
0.25 Ωcm	17.87 cm	7.13 cm^2

Control sliders for ρ , L , and A are shown with a refresh button below.

CONTROL the resistivity, length, and area of the wire

Resistance in a Wire


Model Simplifications

- The black dots in the wire represent impurities in the metal lattice. Materials with a high density of impurities have a higher probability of collision between the electrons and the cations in the lattice, which results in a larger resistivity.

Suggestions for Use

Challenge Prompts

- What variables affect the resistance in the wire? How can you maximize/minimize the resistance in the wire?
- If the area of a wire is doubled, how does its resistance change? Explain.
- How does the resistivity relate to the resistance? Can the resistivity of a material be changed?
- Describe what happens to the flow of electrons when the wire becomes (a) longer or (b) thinner.

See all published activities for Resistance in a Wire [here](#).

For more tips on using PhET sims with your students, see [Tips for Using PhET](#).