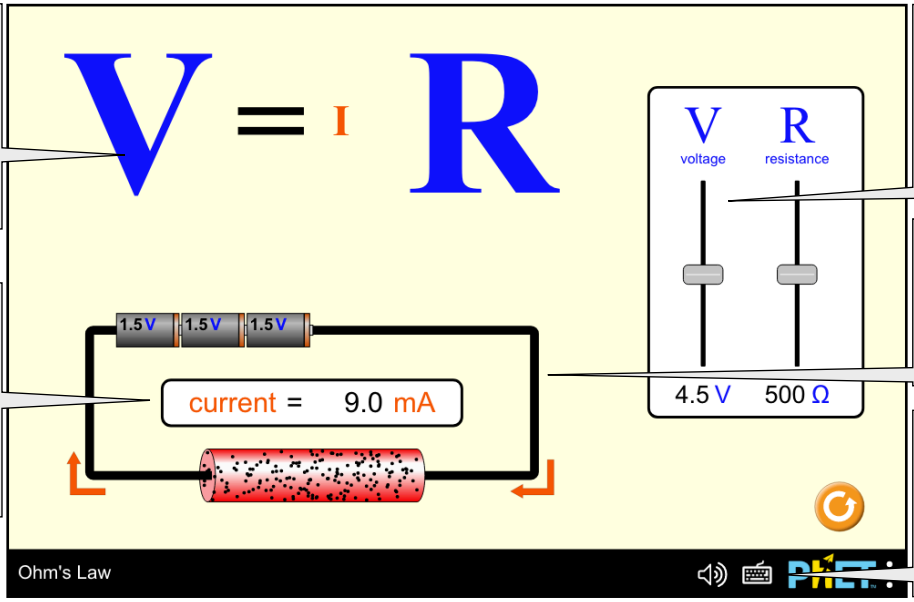
PhET Tips for Teachers

Ohm's Law

In **Ohm's Law**, students explore how changing the voltage (V) or resistance (R) influences current (I) in a circuit.

OBSERVE how the size of the variable changes when the value changes.

MEASURE the current in the circuit for a given voltage and resistance.



CHANGE the voltage or resistance of the circuit.

TRACK changes in the circuit as V and R are varied.

ACCESS sim features (sound on/off, keyboard shortcuts)

Customization Options

Query parameters allow for customization of the simulation, and can be added by appending a '`?`' to the sim URL, and separating each query parameter with a '`&`'. The general URL pattern is:
`...html?queryParameter1&queryParameter2&queryParameter3`

For example, in Ohm's Law, if you want to mute audio (`sound=muted`), and disable external links (`allowLinks=false`) use:
https://phet.colorado.edu/sims/html/ohms-law/latest/ohms-law_all.html?sound=muted&allowLinks=false

To run this in Spanish (`locale=es`), the URL would become:
https://phet.colorado.edu/sims/html/ohms-law/latest/ohms-law_all.html?locale=es&sound=muted&allowLinks=false

Query Parameter and Description	Example Links
`locale` - specify the language of the simulation using ISO 639-1 codes. Available locales can be found on the simulation page on the Translations tab. Note: this only works if the simulation URL ends in "_all.html".	`locale=es` (Spanish) `locale=fr` (French)
`sound` - if muted, audio is muted by default. If disabled, all audio is permanently turned off.	`sound=muted` `sound=disabled`
`allowLinks` - when `false`, disables links that take students to an external URL. Default is `true`.	`allowLinks=false`

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 collisions between the electrons and the cations in the lattice, which results in a higher resistivity.
- Because the length and area of the resistor is unchanged, the resistance slider controls the resistivity of the material.

Suggestions for Use

Sample Challenge Prompts

- Describe what happens to the current in a circuit when the voltage is increased. What happens when the resistance is decreased?
- Does changing the voltage of the circuit cause a change in the resistance? Why or why not?
- Explain why current and resistance are inversely proportional.

Inclusive Features

Sounds and Sonifications

- The pitch of the slider notes is proportional to the size of the current in the circuit and not dependent on specific slider positions. Try to achieve the same note (same current) with different slider positions.
- See the Sound Features Video for more useful tips on how concepts and sound are integrated in this sim. See the published Sound Design Documentation for more details on all sounds in this simulation.

Interactive Description

- This simulation features interactive description to support non-visual access, delivered only while using screen reader software. See the Introduction to Interactive Description video for more info on how to use this feature.
- Teachers can access the A11y View here to decide if this sim's interactive description meets their instructional needs. *Reminder: A11y View is not intended for student use and will not provide a good experience for learners using screen reader software.*

See the simulation page for all supported inclusive features.

See all published activities for Ohm's Law here.
For more tips on using PhET sims with your students, see Tips for Using PhET.