

Electrical Components

Unit: DC Circuits

NGSS Standards/MA Curriculum Frameworks (2016): HS-PS2-9(MA)

AP® Physics 2 Learning Objectives/Essential Knowledge (2024): 11.2.A, 11.2.A.4.ii

Mastery Objective(s): (Students will be able to...)

- Identify electrical components using the components themselves and/or the symbols used in circuit diagrams.
- Describe the purpose of various electrical components and how they are used in circuits.

Success Criteria:

- Descriptions correctly identify the component.
- Purpose and use of component is correct.

Language Objectives:

- Explain the components in an actual circuit or a circuit diagram and describe what each one does.

Tier 2 Vocabulary: component, resistor, fuse

Labs, Activities & Demonstrations:





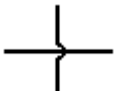





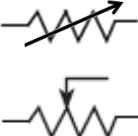









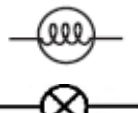

- Show & tell with actual components.
- How a fuse works.

Notes:

electrical component: an object that performs a specific task in an electric circuit. A circuit is a collection of components connected together so that the tasks performed by the individual components combine in some useful way.

circuit diagram: a picture that represents a circuit, with different symbols representing the different components.

The following table describes some of the common components of electrical circuits, what they do, and the symbols that are used to represent them in circuit diagrams.

Component	Symbol	Picture	Description
wire			Carries current in a circuit.
junction			Connection between two or more wires.
unconnected wires			Wires pass by each other but are not connected.
battery			Supplies current at a fixed voltage.
resistor			Resists flow of current.
potentiometer (rheostat, dimmer)			Provides variable (adjustable) resistance.
capacitor			Stores charge.
diode			Allows current to flow in only one direction (from + to -).
light-emitting diode (LED)			Diode that gives off light when current flows through it.
switch			Opens / closes circuit.
incandescent lamp (light)			Provides light (and resistance).

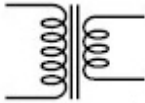




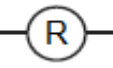
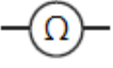




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Big Ideas

Details

Unit: DC Circuits

Component	Symbol	Picture	Description
inductor (transformer)			Increases or decreases voltage in an AC circuit.
voltmeter			Measures voltage (volts).
ammeter			Measures current (amperes).
ohmmeter	 		Measures resistance (ohms).
fuse			Opens circuit if too much current flows through it.
ground	 GND	 (clamps to water pipe)	Neutralizes charge.

For the potentiometer, notice the use of the diagonal arrow across the resistor symbol. The diagonal arrow indicates that the resistance can be adjusted (variable resistance). The diagonal arrow can be used with other symbols (*e.g.*, capacitors) in the same manner.

AP® only

Note that the AP® Physics 2 exam will use just a diagonal slash (without an arrowhead) to indicate variability.