

Use with textbook pages 290–297.

Voltage, current, and resistance

Follow the directions below to demonstrate what you know about voltage, current, and resistance.

1. Define the following terms.

(a) current _____

(b) voltage _____

(c) resistance _____

(d) Ohm's law _____

(e) resistor _____

2. Complete the following table. The table has been partially completed to help you.

	Current	Voltage	Resistance
Symbol	I		
Unit			ohm (Ω)
Meter used for measurement			
Formula			

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Calculations with Ohm's law

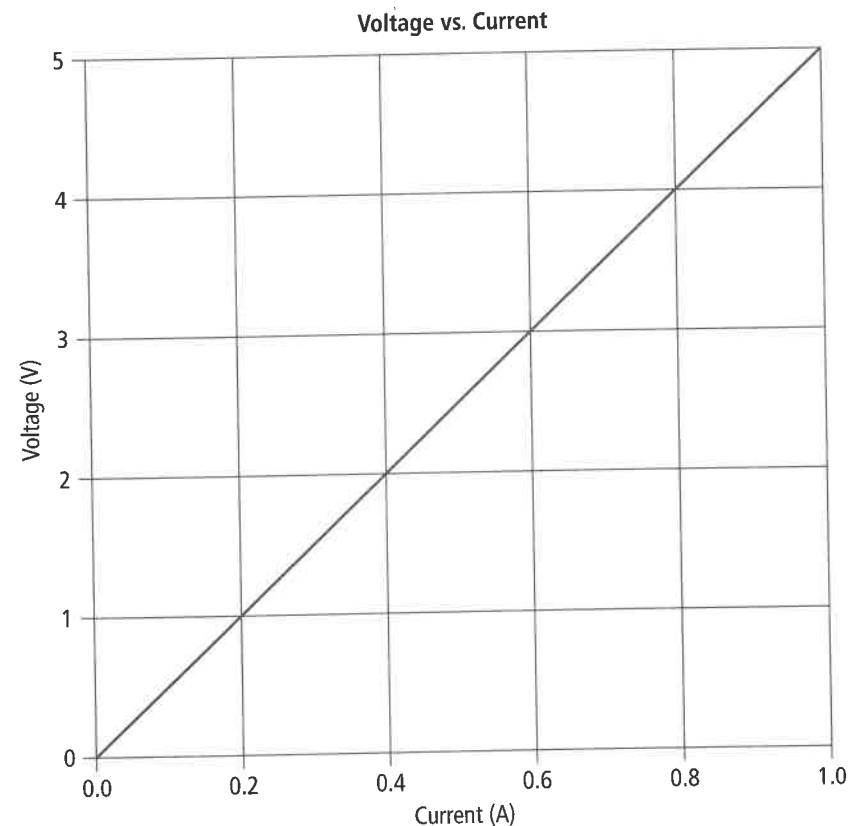
Use Ohm's law to complete the following table. Write the formula you will use and substitute the known values into the formula. Show all your work and include the correct unit with your answer. The first question has been done to help guide you.

	Question	Show your work	Answer
1.	A current through a resistor in a circuit is 1.5 A. If the potential difference across the resistor is 6 V, what is the resistance of the resistor?	$R = V \div I$ $= 6 \text{ V} \div 1.5 \text{ A}$ $= 4 \Omega$	4 Ω
2.	A toaster is plugged into a 120 V outlet. What is the resistance of the toaster if the current in the toaster is 10 A?		
3.	A light bulb with a resistance of 30 Ω is connected to a battery. If the current in the light bulb is 0.2 A, what is the voltage of the battery?		
4.	What is the current in a flashlight bulb with a resistance of 24 Ω if the voltage provided by the flashlight battery is 3 V?		
5.	An electric iron plugged into a wall socket has a resistance of 20 Ω . If the current in the iron is 6 A, what is the voltage provided by the wall socket?		

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Relationship between current, voltage, and resistance

Use the graph below to answer the questions that follow.



1. (a) What happens to the voltage as the current increases?

- (b) What does this suggest about the relationship between voltage and current?

2. According to the graph, what happens to the voltage when the current is doubled?

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Resistance and Ohm's law

Match the Formula or Unit on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Formula or Unit	Descriptor
1. _____ $I = V \div R$	A. unit for voltage
2. _____ $R = V \div I$	B. unit for current
3. _____ $V = I \times R$	C. unit for resistance
4. _____ volts (V)	D. formula for voltage
5. _____ ohms (Ω)	E. formula for current
6. _____ amperes (A)	F. formula for resistance

Circle the letter of the best answer.

7. Which of the following correctly matches the devices with what they measure?

	Ammeter	Ohmmeter	Voltmeter
A.	current	voltage	resistance
B.	resistance	current	voltage
C.	voltage	resistance	current
D.	current	resistance	voltage

8. What is the name of the law given to the mathematical relationship between voltage, current, and resistance?

- A. Ohm's law
 B. Voltage's law
 C. Ampere's law
 D. Electricity's law


9. Which of the following describes resistance?

I.	It resists the flow of electrons.
II.	It speeds up the current flow in a circuit.
III.	It causes the electron's electrical energy to be converted to heat and light energy.

- A. I and II only
 B. I and III only
 C. II and III only
 D. I, II, and III

10. Which of the following occurs if resistance is increased in a circuit?

- A. Both voltage and current will increase.
 B. Both voltage and current will decrease.
 C. Voltage will increase and current will decrease.
 D. Voltage will decrease and current will increase.

11. What does the symbol  represent?

- A. a load
 B. a resistor
 C. a voltmeter
 D. an ammeter

12. A 6 V battery is connected to a 10 Ω resistor. What is the current flowing in the circuit?

- A. 0.6 A
 B. 1.67 A
 C. 4 A
 D. 60 A