LESSON MAKER PRO

Circuits in Action

Use Ohm's law to solve circuit problems.

HIGH SCHOOL · PHY.5.3

PHY.5.3 "Use mathematical and computational analysis to analyze problems dealing with electric field, electric potential, current, voltage, and resistance as related to Ohm's law."

NAME _____ DATE _____

THE BIG IDEA

For a resistor, voltage V, current I, and resistance R follow Ohm's law: V = I × R. Voltage is measured in volts (V), current in amperes (A), and resistance in ohms. Divide or multiply to find the unknown quantity.

WORKED EXAMPLE

A resistor has 35 V across it and a resistance of 5 ohms. What current flows through it?

1. Start with V = I × R.
2. Divide both sides by R: I = V/R.
3. Substitute: I = 35 V/5 ohms = 7 A.

Answer: 7 A

PRACTICE 6 problems

1 A resistor has 24 V across it and a resistance of 8 ohms. Find the current.

ANSWER _____

2 A current of 6 A flows through a 4-ohm resistor. Find the voltage across it.

ANSWER _____

3 A resistor has 36 V across it and carries 4 A. Find its resistance.

ANSWER _____

4 A resistor has 16 V across it and a resistance of 4 ohms. Find the current.

ANSWER _____

5 A current of 2 A flows through a 9-ohm resistor. Find the voltage across it.

ANSWER _____

6 A resistor has 48 V across it and carries 6 A. Find its resistance.

ANSWER _____

APPLY IT Show your work

1 A bike headlight runs from a 12 V battery. Its lamp has a resistance of 6 ohms. What current flows through the lamp?

WORK SPACE

ANSWER _____

2 A phone charging cable carries 2 A and has a resistance of 0.2 ohms. What is the voltage drop across the cable?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two resistors, 4 ohms and 8 ohms, are connected in series to a 24 V battery. In series, resistances add and the same current flows through both resistors. Find the current through the resistors and the voltage across the 8-ohm resistor.

WORK SPACE AND ANSWER

Circuits in Action

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A resistor has 24 V across it and a resistance of 8 ohms. Find the current.	**3 A**
2	A current of 6 A flows through a 4-ohm resistor. Find the voltage across it.	**24 V**
3	A resistor has 36 V across it and carries 4 A. Find its resistance.	**9 ohms**
4	A resistor has 16 V across it and a resistance of 4 ohms. Find the current.	**4 A**
5	A current of 2 A flows through a 9-ohm resistor. Find the voltage across it.	**18 V**
6	A resistor has 48 V across it and carries 6 A. Find its resistance.	**8 ohms**

PART 2 · APPLY IT

1. **2 A** Use I = V/R. Divide 12 V by 6 ohms to get 2 A.
2. **0.4 V** Use V = I × R. Multiply 2 A by 0.2 ohms to get 0.4 V.

CHALLENGE

The total resistance is 12 ohms, so the current is 24 V/12 ohms = 2 A. The voltage across the 8-ohm resistor is 2 A × 8 ohms = 16 V.

Accept the ohm symbol in place of the word “ohms.” In the challenge, both the current and the voltage across the 8-ohm resistor must be correct.