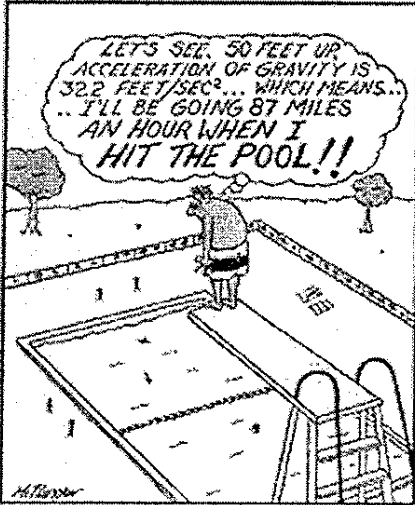


# AP 2 Resistors WS 1

Name: \_\_\_\_\_ Period: \_\_\_\_\_



There are times when being a whiz at physics can be a definite drawback.

I do not fix problems. I fix my thinking. Then problems solve themselves. --Louise Hay

1. Discuss the difference between emf and terminal voltage. Which one is greater?

2. Drift velocity, the average velocity at which electrons travel in a circuit, is on the order of 1mm/s. Yet a lamp comes on instantaneously when you flip a switch. Explain.

3. A 0.60-m-long copper wire has a diameter of 0.10 cm. What is the resistance of the wire?

4. Most lightbulb filaments are made of tungsten and are about the same length. What would be different about the filament in a 60-W bulb compared with that in a 40-W bulb?

TABLE 21-1 Resistivities

Substance	Resistivity, $\rho$ ( $\Omega \cdot \text{m}$ )
<b>Insulators</b>	
Quartz (fused)	$7.5 \times 10^{17}$
Rubber	1 to $100 \times 10^{13}$
Glass	1 to $10,000 \times 10^9$
<b>Semiconductors</b>	
Silicon*	0.10 to 60
Germanium†	0.001 to 0.5
<b>Conductors</b>	
Lead	$22 \times 10^{-8}$
Iron	$9.71 \times 10^{-8}$
Tungsten	$5.6 \times 10^{-8}$
Aluminum	$2.65 \times 10^{-8}$
Gold	$2.20 \times 10^{-8}$
Copper	$1.68 \times 10^{-8}$
Silver	$1.59 \times 10^{-8}$

\*The resistivity of a semiconductor varies greatly with the type and amount of impurities it contains. This property makes them particularly useful in electronic applications.

5. Which one consumes more power from a 12-V battery, a 5.0- $\Omega$  resistor or a 10- $\Omega$  resistor? Why?

6. A digital video disc (DVD) player is rated at 100 W at 120 V. What is its resistance?
7. A freezer of resistance  $10 \Omega$  is connected to a 110-V source. What is the power delivered when this freezer is on?
8. The current through a refrigerator with a resistance of  $12 \Omega$  is 13 A (when the refrigerator is on). What is the power delivered to the refrigerator?
9. Two wires are identical, except that one is aluminum and one is copper. The aluminum wire has a resistance of  $0.02 \Omega$ . What is the resistance of the copper wire? Extra info
10. A cylindrical copper cable carries a current of 1200 A. There is a potential difference of  $1.6 \times 10^{-2} \text{ V}$  between two points of the cable that are 0.24 m apart. What is the radius of the cable?
11. A wire has a resistance of  $21.0 \Omega$ . It is melted down from the same volume of metal a new wire is made that is three times longer than the original wire. What is the resistance of the new wire?