CONCEPT: POWER IN CIRCUITS

● Resistance → internal friction in conductors, so Energy is lost ("dissipated") as charges move through

● Energy lost in a resistor:

$\Delta U =$ _____

● Remember that POWER is how _____ energy changes → **P =** _____

Power Output in ANY circuit element
$P =$ _____

Power dissipated by a RESISTOR
$P =$ _____ = _____ = _____

- Power dissipated by a resistor is generated in the form of _____ & _____. (e.g. lightbulbs, toasters, etc.)

EXAMPLE: A battery operates at a voltage of 9V. If the battery is outputting 540W of energy, how much current is the battery producing?

EXAMPLE: A resistor attached to a battery has a resistance of 30kΩ, and a current of 60mA. How much energy does this resistor generate in the form of heat in 1 minute?

PRACTICE: POWER IN A HAIR DRYER

A hair dryer operates at 120V (the voltage produced by a household outlet), and outputs 1200 W of energy. For this problem, treat the hair dryer as a single resistor.

(a) At what current does the hair dryer operate?

(b) What is the resistance of the hair dryer?

PRACTICE: POWER OUTPUT BY A LIGHTBULB

An incandescent lightbulb produces 100W of light. If this lightbulb operates at 25% efficiency (meaning that out of all the power it generates, only 25% is released as light), what resistance must the lightbulb have if it operates at 120V?