Circuit Analysis Worksheet

Name: _____ Date: _____

Lesson 2 – Circuit Analysis: Ohm's Law and Series Circuits

Part 1: Key Concepts

Ohm's Law:
$V = I \times R$

Where:
- V is voltage in volts (V)
- I is current in amperes (A)
- R is resistance in ohms (Ω)

Part 2: Predict Current

1. You have a 3V battery and a 330Ω resistor connected in series with an LED.
What is the expected current in the circuit?
$I = V / R = 3V / 330Ω =$ _____ A

2. If the battery voltage drops to 2V, what is the new current?
$I = 2V / 330Ω =$ _____ A

Part 3: Measure & Compare

Complete the table below using your predictions and measurements (if a multimeter is available):

Configuration	Voltage (V)	Resistance (Ω)	Predicted Current (A)	Measured Current (A)
LED + 330Ω resistor				
LED + 1kΩ resistor				

Part 4: Reflection

1. What happened to the current when you increased the resistance?

2. Why is it important to limit current in an LED circuit?

3. What are some signs that a component is connected incorrectly?

🔍 Answer Key – Teacher Reference

🔌 Part 2: Predict Current

1. I = V / R = 3V / 330Ω ≈ 0.0091 A (or 9.1 mA)

2. I = V / R = 2V / 330Ω ≈ 0.0061 A (or 6.1 mA)

🔧 Part 3: Measure & Compare (Typical Values)

Configuration	Voltage (V)	Resistance (Ω)	Predicted Current (A)	Measured Current (A)
LED + 330Ω resistor	3V	330Ω	0.0091 A (9.1 mA)	~8–10 mA (depending on LED and contact resistance)
LED + 1kΩ resistor	3V	1000Ω	0.0030 A (3.0 mA)	~2.5–3.2 mA

🧠 Part 4: Reflection (Sample Answers)

1. The current decreased when resistance increased, demonstrating Ohm's Law: more resistance means less current for the same voltage.

2. Limiting current protects the LED from burning out, since LEDs are sensitive to high current.

3. Common signs of incorrect connections include: LED not lighting up, reversed polarity, or excess heat from a component.