Circuit Building Worksheet

Name: _____ Date: _____

Lesson 1 – Circuit Building

Objective:
Today you will build your own simple infrared LED circuit using a battery, resistor, and LED. You'll learn about circuits, current flow, and basic engineering troubleshooting!

Part 1: Understanding the Components

Component	What it Does
Battery	Provides power for the circuit
Resistor	Controls the amount of current flowing
IR LED	Emits invisible light

Part 2: Plan Your Circuit

Sketch your circuit:

Use this space to draw how the battery, resistor, and IR LED connect.
(Hint: the long leg of the LED is the + side.)

Part 3: Build It!

Checklist:

- ☐ Connect the positive side of the battery to the resistor.
- ☐ Connect the resistor to the long leg of the IR LED (the anode).
- ☐ Connect the short leg of the LED (the cathode) back to the negative side of the battery.

Reminder:
Electricity flows from positive ➔ through the resistor ➔ through the LED ➔ to negative.

Part 4: Test and Troubleshoot

Answer these questions:

1. When you complete the circuit, does the LED light up?

2. If it doesn't work, what could be wrong? (Check all you think apply)

☐ Battery is dead
☐ LED is backwards
☐ Loose wire connections
☐ Missing resistor

Part 5: Think Like an Engineer

- What part of the building process was the hardest?

- If you could improve the circuit, what would you add or change?

Bonus Challenge! (Optional)

Design a circuit upgrade that uses a button to turn the LED on and off.

Teacher Answer Key

Part 1: Understanding the Components

Battery – Provides power for the circuit
Resistor – Controls the amount of current flowing
IR LED – Emits invisible light

Part 2: Plan Your Circuit

Correct sketch should show:
- Positive terminal of battery connected to one side of resistor
- Other side of resistor connected to long leg (anode) of LED
- Short leg (cathode) of LED connected back to negative terminal of battery

Part 3: Build It!

Correct build sequence:

1. Battery positive ➔ Resistor
2. Resistor ➔ LED anode (long leg)
3. LED cathode (short leg) ➔ Battery negative

Part 4: Test and Troubleshoot

1. LED should light up if circuit is correct.
2. Common issues:
- Battery is dead
- LED is backwards
- Loose connections
- Missing resistor (circuit may still work but LED could burn out quickly)

Part 5: Think Like an Engineer

Answers will vary. Look for thoughtful responses, including challenges with wiring, LED polarity, or handling components.
Improvements might include adding a button, case, or visible LED.

Bonus Challenge!

To use a button:
- Place the button between the battery and resistor (or between resistor and LED)
- When button is pressed, the circuit is completed and LED turns on