Circuit Building Worksheet

Name: _____ Date: _____

Lesson 1 – Circuit Building

Objective:

Today you will build your own Wizardly Wand using an infrared LED and a battery. You'll learn about circuits, current flow, and basic engineering troubleshooting!

Part 1: Understanding the Components

Match the description to the part!

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

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 point the wand at the cube, does anything happen?

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

Reflection:

- What part of the building process was the hardest?

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

Bonus Challenge!

Optional:
Design a "wand upgrade" that uses a button to turn the LED on and off.

Teacher Notes:

Learning Goals:

- • Basic circuit assembly
- • Intro to schematic diagrams
- • Troubleshooting and iteration

Supplies Needed per Student:

- • 1x IR LED
- • 1x 100–220Ω resistor
- • 1x 3V battery (like a coin cell)
- • Electrical tape or simple breadboard
- • Optional: pushbutton switch