UNIT: CIRCUITRY GAME

ACT-Based Reading: Troubleshooting Guide Evaluation

### Here are ACT-aligned math activities for the Build Your Own Circuitry Game that help students apply real-world skills in electrical measurement, formula application, and data interpretation relevant to voltage, current, and resistance in circuit design.

### Objective:

Students evaluate troubleshooting guides for common circuit issues.

MATERIALS NEEDED:

* Sample troubleshooting guides
* Worksheet

Student Directions:

**Goal:**  
You will practice reading and analyzing troubleshooting guides to diagnose problems in a simple circuit that isn’t working. You’ll evaluate the steps, select the most effective solutions, and explain your reasoning—skills that support ACT reading comprehension and real-world STEM troubleshooting.

**STUDENT DIRECTIONS**

**STEP 1: Read the Troubleshooting Guide Carefully**

* Read each step in the sample troubleshooting guide slowly and carefully.
* Highlight or underline **key actions** (e.g., “check battery,” “swap components,” “test each section”) and **important terms** (e.g., “polarity,” “faulty,” “connections”).

Ask yourself:

* What is the purpose of this step?
* What kind of circuit problem would it solve?

**STEP 2: Evaluate the Effectiveness of Each Step**

* Think about how each troubleshooting step helps fix a non-working circuit.
* Use your knowledge of circuits (and what you’ve learned from the game kit) to decide:
  + Which step would be **most helpful** to try **first**
  + Which step might be **more advanced** or used **later in the process**

Example:  
If the battery is dead, testing other components won’t help—so checking the power source first is most logical.

**STEP 3: Choose the Most Effective Solution**

* On your worksheet, read the provided circuit issue (e.g., “The LED does not turn on.”).
* Look at the answer choices or multiple troubleshooting steps.
* Decide which step should come first or is most likely to solve the problem.

Tip: Don’t just guess. Think like a technician: **What’s the simplest and most likely cause?**

**STEP 4: Justify Your Answer**

* Below your answer, write 2–3 sentences explaining **why** you chose that step.
* Use cause-and-effect logic. For example:

“I chose this step because if the LED is installed backward, it won’t allow current to pass. Polarity is important in diodes like LEDs.”

**STEP 5: Extension (Optional or Group Activity)**

* Compare your answers with a partner or group.
* Did you choose the same first step? Why or why not?
* What other logical steps could follow if your first fix didn’t work?

**Quick Troubleshooting Guide: Circuit Won’t Power On**

1. **Check the Power Source**  
   Make sure the battery is connected correctly and has charge.
2. **Inspect Connections**  
   Look for loose or misplaced wires on the breadboard.
3. **Test Components**  
   Try swapping the LED, resistor, or battery to see if a part is faulty.
4. **Check Polarity**  
   Ensure the LED and other polarized components are facing the right direction.
5. **Isolate the Problem**  
   Break the circuit into parts and test each section individually

## ACT-Style Question:

## If an LED does not turn on in a circuit, what should you check first?

## The brightness levels

## The polarity and connections

## The room temperature

## The size of the LED

## **Why These Activities and Questions Matter**

By engaging in reading-based activities connected to the *Build Your Own Circuitry Game*, students:

✅ Practice identifying key ideas and technical details in circuit design documents and user manuals.  
✅ Strengthen their ability to comprehend and evaluate cause-and-effect relationships in electrical systems.  
✅ Develop analytical reading skills by synthesizing information from multiple technical sources.

These skills mirror the ACT Reading requirements—helping students become confident, critical readers prepared for college-level science texts and careers in STEM.