STEM 101
Powered by THE STEM ACADEMY

Name: _____
Period: _____

UNIT: ELECTRICAL CIRCUITS

SOLAR SIGNAL SHIELD

OBJECTIVE:

Build a "sun-activated" signal system using reflected light and a circuit.

MATERIALS:

- ✓ 1 LED
- ✓ 1 battery + battery holder
- ✓ 2 wires or foil strips (to complete your circuit)
- ✓ 1 small mirror or piece of aluminum foil
- ✓ 1 paper cup or cardboard dome (to act as your “signal shield”)
- ✓ Flashlight (if sunlight isn’t available)

STUDENT DIRECTIONS:

Build the Circuit

- Connect the positive wire from the battery to the positive leg of the LED.
- Connect the negative wire from the battery to the negative leg of the LED.
- Make sure everything is securely connected using the battery holder.

Step 1: Mount the LED in the Shield

- Place the LED inside the paper cup or cardboard dome to act like a signal lamp.
- Cut a small hole if needed to let the LED poke through the top of the dome.

Step 2: Use Reflected Light to Signal

- Hold the mirror or foil to reflect sunlight (or flashlight beam) onto the dome.
- Aim the beam at the LED shield.
- Try tilting the mirror or foil to create a flashing effect, like an SOS signal.

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Observe & Record:

- What do you notice when light hits the reflective surface?

_____

_____

- What happens when you move or tilt the reflective surface?

_____

_____

Real-World Connection:

- Why would a light-based signal be helpful in a jungle rescue situation?

_____

_____

- What energy transformations happen in your design?

_____

_____

- What do you notice when light hits the reflective surface?

_____

_____

- Why would this be useful in a jungle rescue?

_____

_____

STANDARDS ALIGNMENT

NGSS: 4-PS3-2, 4-PS3-4 **ETS:** 3-5-ETS1-1, 3-5-ETS1-2 **STEL:** STEL 1A, STEL 2A, STEL 4A, STEL 5A, STEL 7A, STEL 8A **CCSS:** CCSS.MATH.CONTENT.3.MD.C.5–7, CCSS.MATH.CONTENT.4.MD.A.1, CCSS.MATH.PRACTICE.MP2, CCSS.MATH.PRACTICE.MP4, CCSS.MATH.PRACTICE.MP5