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.

**Observe & Record:**

* What do you notice when light hits the reflective surface?   
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* What happens when you move or tilt the reflective surface?   
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**Real-World Connection:**

* Why would a light-based signal be helpful in a jungle rescue situation?   
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* What energy transformations happen in your design?   
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* What do you notice when light hits the reflective surface?   
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* Why would this be useful in a jungle rescue?   
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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