



# GEMS Challenges ----- LED Throwies

**SUBJECT**

Science--Electricity

**Suggested grades**

2-12

**Cautions/concerns**

Pay attention to the length of the leads so the girls don't fry them when they attach the batteries

**The Challenge—understand how LEDs work and make magnetic lights to take home**

**LEADER ACTIONS****GIRL ACTIONS**

INTRODUCTION	Present the challenge—you want to decorate the outside of a shed for an evening party but don't have electricity outside. What can you use?	Brainstorm options
BACKGROUND INFORMATION	<p>Present the option of LED Throwies—battery-operated lights that stay lit for up to 2 weeks through weather changes.</p> <p>Explain what an LED is (Light-emitting diode) and ask girls where they might be in their world. (remote controls, flashlights, turn signals, etc.)</p>	<p>Discuss concerns—environmental (recycling batteries, safety etc.)</p> <p>Discuss where they have seen LEDs</p>
ACTIVITY	<p>Pass out supply bags. Have each girl look at her supplies. Ask—what do you notice about the battery? (+ and – on the two sides) What do you notice about the LED? (One 'leg' is longer than the other, colors, etc)</p> <p>Have each girl place her batteries positive side up on table. (+ side) and lay out the LEDs with the longer leg (+) on the right.</p> <p>Have each girl tear off three 6-inch lengths of tape and have them ready.</p> <p>Warn the girls that if they connect the wrong legs to the battery, they can short out the LED. Ask them if they have ever known of anything short-circuiting?</p>	<p>Observe and discuss supplies</p> <p>Lay out supplies.</p> <p>Tear off tape and attach to edge of table.</p>

## LEADER ACTIONS

## GIRL ACTIONS

	<p>Show the girls how to slide the LED onto the battery. They will love how it lights up. Watch to see that everyone's lights work. If all lights work, show them how to wrap half the tape around the light, leaving half of the tape as a tail.</p> <p>Pick up the magnet and place it on the wrapped battery and continue wrapping the tape around until the magnet is covered. At this point, only touch the battery/magnet.</p> <p>Use the rest of the LEDs to make more. Work with the girls to figure out how many lights one battery will support.</p>	<p>Slide light onto battery. If it lights, wrap half of tape around it to secure the light to the battery.</p> <p>Attach the magnet by wrapping the rest of the tape securely around the battery.</p> <p>Make the rest of the Throwies.</p>
CONCLUSION	<p>How does this solve the original challenge of outdoor decoration?</p> <p>What problems did you face while you were making these? How did you solve them?</p> <p>Review safety and environmental concerns</p>	<p>Discuss how these could be used.</p> <p>Discuss problems and solutions</p>
REFLECTION	<p>Using the GEMS reflection cards, have one or two girls pull a card from the deck and answer the questions.</p>	<p>Reflect on the experience</p>

### Supplies

For each girl, in a little bag:

- At least 5-6 10 mm diffused LEDs of assorted colors
- 3 button neodymium magnets (NdFeD plated)
- 3 3V button batteries—CR 2032 lithium

For each group—access to good quality masking or packaging tape, scissors for tape

### Preparation needed

- Bag up supplies
- Print handout

### Comments

Remind the girls to watch their pets or young siblings—these are dangerous in young hands.

Remind the girls to remove the Throwie and recycle the battery and light when it burns out. Re-use the magnet!!