

# KALEIDOSCOPE & PERISCOPE (1 OF 2)

## ELEMENTARY SCHOOL LEVEL 2

Have you gazed through a kaleidoscope before? Watched a fractal reality twisting on itself? How does it work? The kaleidoscope is an optical instrument with reflective surfaces angled to each other in a way that objects at the end of the device are reflected in a geometric pattern through the optic lens.

### EDUCATIONAL STANDARDS:

#### NGSS CONNECTION:

**1-PS4-2.** Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.

#### COMMON CORE CONNECTION:

##### ELA/Literacy

**W.1.2** Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.

**W.1.7** Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions).

**W.1.8** With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

**SL.1.1** Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

#### Mathematics

##### MP.4

Model with mathematics.

#### DOK:

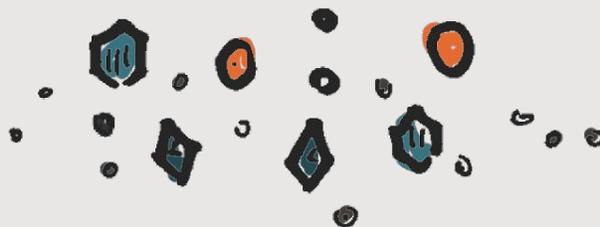
Level 3: Strategic Thinking

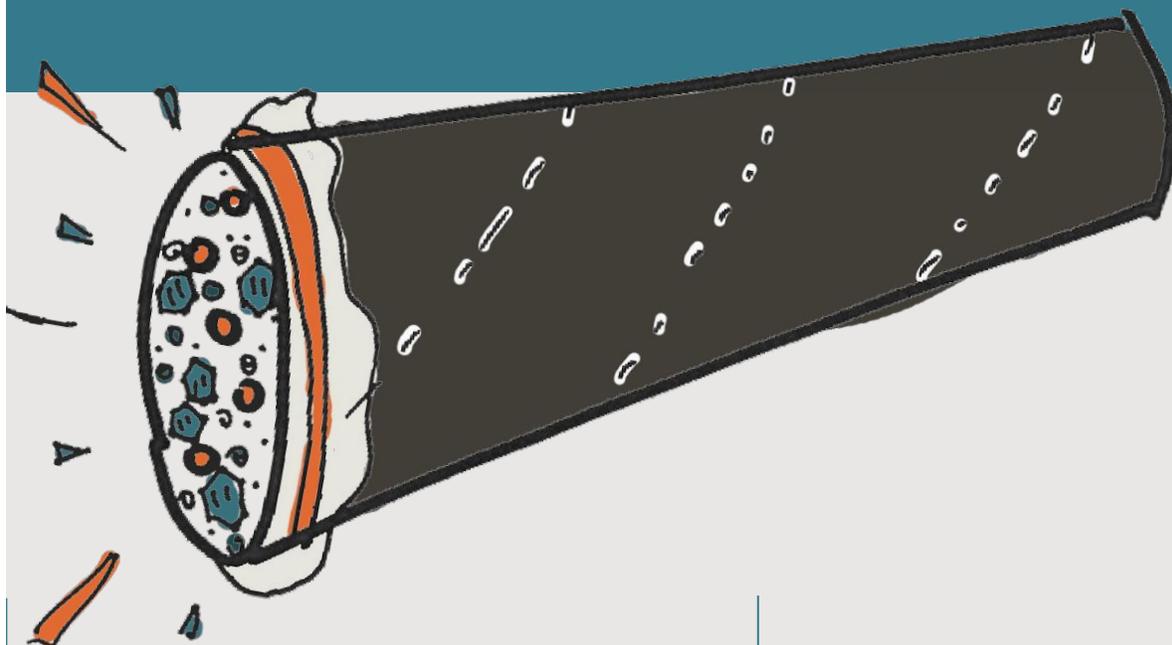
### MATERIALS NEEDED:

- Cardboard tube
- Firm clear plastic sheet
- Hammer and nail
- Clear glue
- Plastic wrap
- Tissue paper
- Wrapping paper (Transparent)
- Clear plastic pieces, beads, or scraps.

### DIRECTIONS:

1. Draw a rectangle on the clear plastic sheet the length of the tube and two and a half times as wide.
2. Draw lines dividing the rectangle into 3 parts lengthwise.
3. Fold the plastic along the lines drawn, making a triangle. Use tape to hold the shape.
4. Place the plastic prism into the tube, use tape to secure.
5. Decorate the outside of your tube.





6. Cover the bottom of the tube with a piece of black construction paper. Use tape to hold it in place. Carefully punch a small eye hole in the center of the cover.
7. Cover the top end of the tube with plastic wrap. Gently push the center of the plastic into the tube to make a little cup.
8. Place small pieces of transparent colored plastic in the cup. Beads work well here.
9. Cover the top with transparent or wax paper. Hold in place with a rubber band, cut off excess material, and tape in place.
10. Point the tube at a light source and look through your eye hole; turn the tube in your hands and watch the pattern change.

### OBJECTIVE:

Students will construct kaleidoscopes to observe that objects are only visible when illuminated by light.

### ESSENTIAL QUESTION:

- What allows an object to be visible?

### ENGAGE / EXPLORE:

1. Have students design and create a kaleidoscope
  - a. Students shouldn't look through it YET!
2. Ask students to attach a dark piece of paper over the light hole
  - a. This is to block any incoming light
    - i. Ask students to draw or say what they see
      1. They should see nothing or blackness
    - ii. Ask students why they do not see anything
3. Remove the cover and ask them to share what they see
  - a. Students should draw and articulate what they see
4. Evaluate
  - a. Observations
  - b. Creating conclusions that are supported through observations.