

KALEIDOSCOPE & PERISCOPE (2 OF 2)

ELEMENTARY SCHOOL LEVEL 2

The periscope is an instrument used to see over or around objects. This is done by angling mirrors 45 degrees to one another inside of a tube. In this exercise, students will be making a periscope from empty milk containers. This is a great way for students to learn about light reflection.

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 the 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 this 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 level topics and texts with peers and adults in small and larger groups.

Mathematics

MP.4 Model with mathematics.

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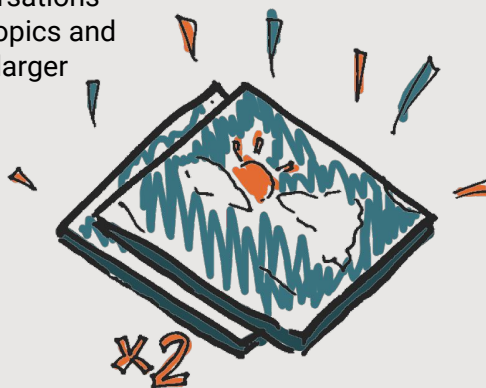
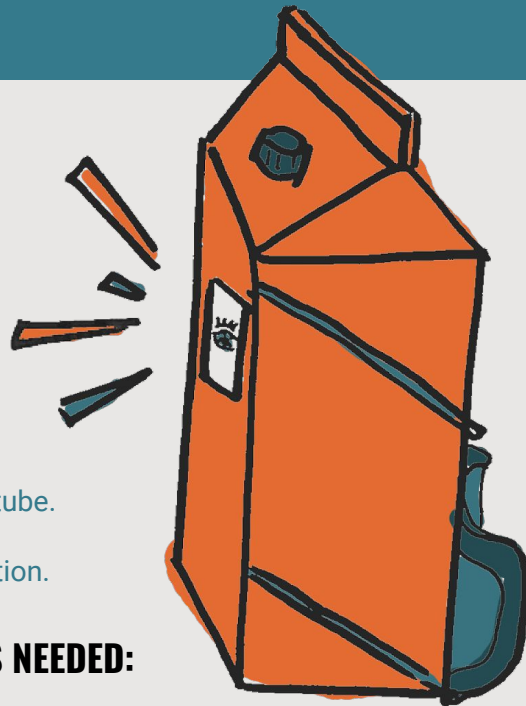
Level 3: Strategic Thinking

MATERIALS NEEDED:

- ☐ 2 half-gallon milk or juice containers
- ☐ 2 4x4 mirrors
- ☐ Masking tape
- ☐ Pencil or pen

DIRECTIONS:

1. Cut the pointed ends off of both containers.
2. On the bottom front of both boxes, cut a window out leaving a half inch on both sides.
3. Place one of the cartons on its side with the open window pointing to the right. On the side facing upward, measure $2\frac{3}{4}$ inches from the top left corner and make a mark with your pen or pencil.
4. Use the ruler to draw a straight line through the mark you made to the top right corner of the carton.



5. Use a box cutter to make an opening the same size as the side of the mirror.
6. Repeat steps 3-5 with the other container.
7. Insert the mirror into the opening you made on one of the cartons. Look through the window in the container and adjust the mirror to line up your vision.
8. Repeat step 7 with the other container.
9. Finally, insert one of the open ends of the container into the other, windows facing away from each other. Use the tape to secure the containers together, and you're done! Look through the window and see what you've made. Now you can spy around corners and over walls!

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?

EXPLAIN:

1. Question students
 - a. What was different from the first time you looked and the second?
 - b. What allowed those objects to appear?
2. Discuss with students
 - a. Without light objects that are there may not be seen by your eyes
 - b. Light allows object to be seen



ELABORATE:

1. Ask students to show another example of how without light they cannot see things
 - a. Examples may include covering or closing their eyes, shutting curtains, turning off classroom lights.
 - b. Anecdotal evidence can be supported as well
 - i. When they asleep they cannot see things
 - ii. At night it's hard to see
2. Students construct the periscope activity
 - a. Students use their knowledge of light and its ability to illuminate to produce an evidence-based account of how it works
 - b. Students can share their explanations with parents and classmates
 - i. They can make their explanations into a creative song
 - ii. Use drawings to help support their accounts.
3. Evaluate
 - a. Students examples and comprehension of light illumination
 - b. Use of observations to support