

Can Your Reflection Make You Question Reality?



IMPOSSIBLE
SCIENCE

Objective: After viewing a demonstration, students will be able to explain the law of reflection and how ambiguous shapes work.



Procedure

1. **Ask:** *Can an object's reflection ever be different? Why? Why not?*
2. **Demonstrate:** Ask a student to hold the ambiguous figure up to the class for everyone to see. Students should write down or draw the shape that they see. Then, have the student hold it up to the mirror for students to see the different reflection.
3. **Explain** that an ambiguous figure is an object that has two images within the same image. It can actually be two different shapes from two different vantage points.
4. **Show** [Impossible Science](#) video, pausing for notes and

Materials:

- Mirror
- Ambiguous figures based on Kokichi Sugihara's designs (order or 3D print)
- Cubes you can see through such as a plastic strawberry basket, a clear Tupperware square or rectangle, straws connected at the corners to form a cube.

explanation. Make sure students record the following notes from the video:
-Ambiguous figure: an object that has two images in the same image
-It can actually be two different shapes from two different vantage points.
-Mirrors reflect front to back. -Law of reflection:
the angle of light coming in is equal to the angle of the light coming out.
-The angle of incidence is equal to the angle of reflection (students should sketch the demo)

Assessment:

Students should write an explanation of how ambiguous shapes work citing Kokichi Sugahara's description and their own examples.

Challenge: Students can create their own ambiguous shape that changes with different vantage points.

5. Give each student a see through cube- either a tupperware container, a plastic fruit basket, or sticks or straws connected at the corners to make a cube.
6. Have students view the cubes from different angles covering one eye and then the other. Ask if they can change their perspective to see the farthest corner as the closest corner when they cover an eye or shift their position.

Watch the companion video here:

Safety Note:

Adult Supervision Recommended



Lesson Plan by Whitney Gallagher based on the "Impossible Science" series.

Find more at impossiblescience.com

