

Topics: Geometry, 3-Dimensional Shapes, Puzzle Building

Materials List

- ✓ 8 wood or paper cubes
- ✓ Sticky Tape
- ✓ Square Pictures sized to 4-cube face
- ✓ Pens, markers, and/or colored pencils

This activity can be used to support the teaching of:

- 2-Dimensional representations of 3-Dimensional objects (Common Core Math Standards: Grade 6, Geometry, 4)
- Problem Solving (Common Core Math Standards: Mathematical Practices: Grades 4-12)
- Science & Engineering Practices (Next Generation Science Standards: Grades 4-12)

Eight Cube Picture Puzzle

A Clever, Morphing Geometric Shape

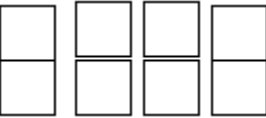
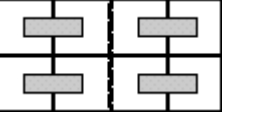
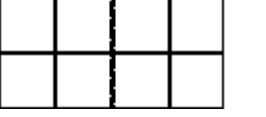
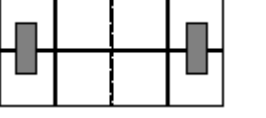
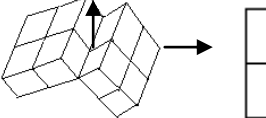
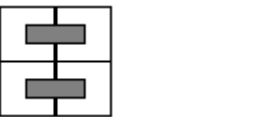


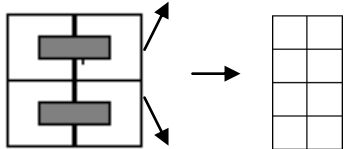
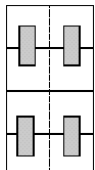
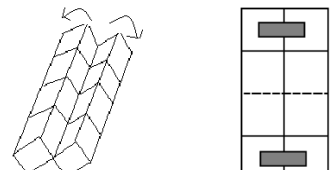
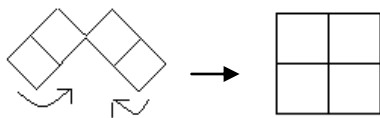
[Image source: <http://www.screamaria.com/cubes.html>]

This puzzle helps students learn visualization, geometry, problem solving and spatial thinking skills as they try to puzzle out the cubic patterns.

To Do and Notice

A. Building the Cube:

	1. Lay four cubes as shown and tape in pairs
	2. Flip each pair over
	3. Put other four cubes in between taped pairs
	4. Tape cubes across in pairs as shown
	5. Roll top row up and bottom row down to open up center. [Note: The middle block pairs are not yet connected]
	6. Tape end pairs
	7. Hold with two hands on top and turn towards you so middle pops out
	8. Tape horizontal pairs [Note: All block pieces are interconnected at this point]

	9. Roll top row away from you and bottom row towards you so you see all eight cubes
	10. Tape vertical pairs
	11. Open out middle one more time and tape horizontal pair on top and on bottom
	12. Bend back top and bottom to expose middle – this gives you the right starting face for gluing on pictures.

Decorating the Cube with Pictures:

1. Start cube as was at end of step 12 above.
2. Follow through folding directions to expose each new face and glue on pictures. [Note: Do not rotate cube other than as directed]
3. Once completed, play around to see how the cubes and their patterns combine to change with each fold.

The Content Behind the Activity

Solving puzzles of any type enhances logical thinking and problem solving skills, needed for both mathematical and scientific thought processes. In order to create and use this 3-dimensional puzzle, students must continually evaluate patterns and relationships represented by the cubes.

Taking it Further

- Encourage younger students to draw and color animals, birds, or other themes.
- Use this cube as a unique format for a book report: Title on one face, characters on another face, plot on a third face, and so on.
- Introduce the Rubik's cube to challenge more advanced students with cubic puzzles
- For more 3-dimensional puzzle ideas, also see RAFT Idea Sheet: *Secrets of the Pyramid*

Depending on how it is used, educators could incorporate this activity creatively for any topic and subject.

Web Resources (Visit www.raft.net/raft-idea?isid=132 for more resources!)

More information on this cube puzzle is available at:

<http://www.mathematische-basteleien.de/magiccube.htm>