

Cube of Doors



In her adventures in Wonderland, Alice solves many puzzles and faces many challenges. This activity encourages children to make their own puzzles and solve them too! As they create three-dimensional cubes from two-dimensional patterns, children will think about spatial relations and practice their beginning geometry skills.

Did You Know?

- ♣ *Conundrum* is another word for 'puzzle' or 'play on words'.
- ♦ Lewis Carroll, who wrote *Alice's Adventures in Wonderland*, loved math. He created many word and math puzzles for his friend Alice to solve.

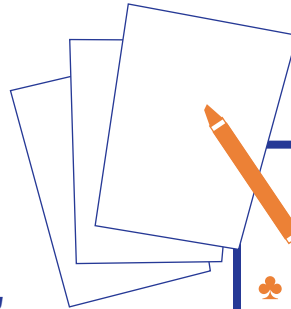
To Get Ready:

You might want to prepare the square patterns in advance for the students.



To Start, Ask:

What comes to mind when you think of a cube? An ice cube? A block? A cardboard box?



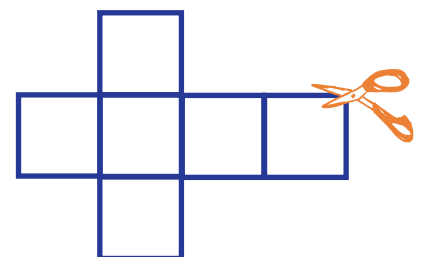
square pattern

What you'll need: (for each student)

- ♣ at least 3 sheets of paper
- ♦ pencil or crayon
- ♠ scissors
- ♥ square pattern (found on this page)
- ♣ tape

Try It!:

- ♣ A cube is actually 6 squares put together to make a three-dimensional shape. Imagine cutting a box apart at its seams and laying it flat on the floor. You would find six squares all hooked together. When you fold the flattened box up again, you create a cube. In this activity, you'll use six paper squares to make your own cube room.
- ♦ Six squares, arranged in special ways, can be cut out and folded to create a three-dimensional room. Give it a try by arranging the six squares so that at least one side of each square is touching another square, tracing them onto a piece of paper, and cutting out your pattern. Remember, only cut the sides that are not attached to another square.
- ♠ Before you fold your pattern into a cube, make a prediction. If your cube were a room, where do you think doors and windows might go? Draw in your doors and windows before you fold your paper into a cube.
- ♥ Once you make your cube, you can tape it together. Did the doors end up where you thought they would?
- ♣ Now try placing the six squares in a different arrangement. Where do you think the doors and windows should go in this arrangement?





Questions to think about and ask:

- Do you think you could create a cube with seven squares?
- How many different ways can you arrange six squares so that they form a cube when you fold them up? (There are actually eleven different ways to arrange the squares.)
- Did the doors that you drew end up where you thought they would? What surprised you?
- If you put six squares together in a row, do they still form a cube when you fold them up?



Assess What Happened (Students reflect):

Invite students to think about and write a story about being inside of a triangular or circular room. How would this be different from the tiny cubic room that they've created?

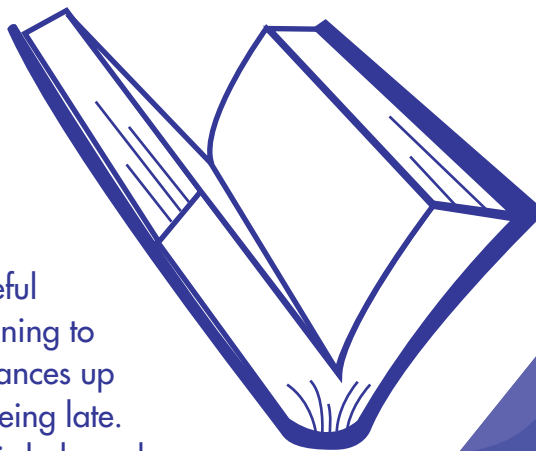


Connect it to Standards:

"In pre-Kindergarten through grade 2, all students should recognize, name, build, draw, compare, and sort two-and three-dimensional shapes..."
(National Council for the Teaching of Mathematics)

Connect it to the Story!

Alice begins her adventures at a peaceful spot along the river where she is beginning to get bored. At just that moment, she glances up to see a rabbit who is worried about being late. Alice follows the White Rabbit down his hole and falls into a long, low hallway with doors all around. All of the doors are locked, and the door to the garden, where she would most like to go, is too small for her to fit through. Alice must use her best problem-solving skills to solve the puzzle of the Hall of Doors to get out into the garden. You too must solve the puzzle of the Cube of Doors.



Career Corner:

Mathematicians are people who use patterns and numbers in their careers. If you like solving puzzles or playing word games, you might enjoy a career in math.

Alice's Wonderland
a most curious adventure

