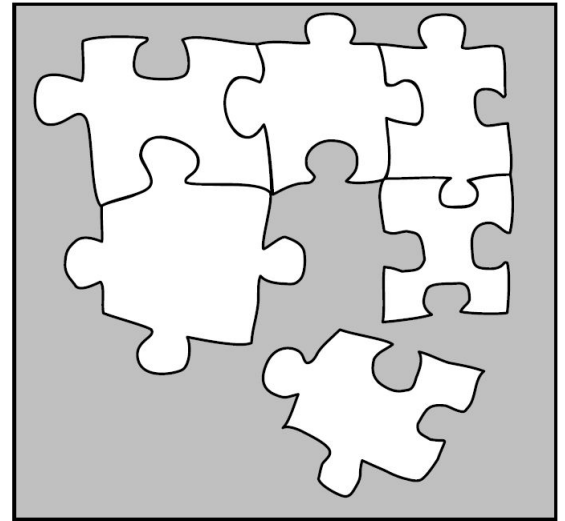


## **6.1.1 How can I move a shape on a grid?**

### **Rigid Transformations**

How can you describe the movement of a figure on a flat surface when it is not moving in a straight line? For example, when you need to move a loose puzzle piece into the puzzle (as shown at right), how can you describe the way its position changes?

Today you will explore mathematical ways of sliding, turning, and flipping an object without changing its size or shape. These types of movements are called rigid transformations. You will solve challenge problems as you explore the transformations.



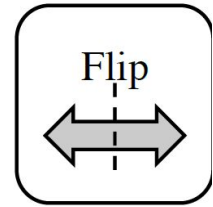
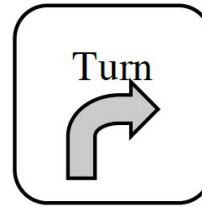
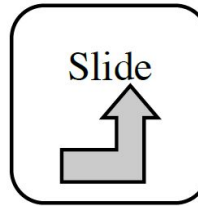
### **WARM-UP**

How would you describe to a child how to move the last puzzle piece (in the picture) to complete the puzzle? Describe step by step movements to put the piece in place.

## CLASS ACTIVITY

### 6-1. KEY-IN-THE-LOCK PUZZLES

Are you ready for a puzzle challenge? We will use the technology tool “Rigid Transformations” (also available at [www.cpm.org/students/technology](http://www.cpm.org/students/technology)). Our job will be to move the key to the keyhole to unlock the door, using the transformation buttons shown at right. We will need to tell the computer about how we want the key to move. For example, how far to the left or right and how far up or down do you want the key to slide? In which direction do you want your key to flip?



**Our Task:** For each puzzle, move the key to the keyhole. Remember that to unlock the door, the key must fit exactly into the keyhole and not be upside down. Also note that your key will not be able to move through walls.

My Puzzle #1 Strategy	Class Puzzle #1 Strategies • Slide left 7 • Slide down 6 • Turn 90° CCW
My Puzzle #2 Strategy	Class Puzzle #2 Strategies • Slide right 1 • Slide down 4 • Flip over $x=2$
My Puzzle #3 Strategy	Class Puzzle #3 Strategies • Slide right 7 • Slide up 5 • Turn 90° CW • Flip over $y=2$