## Lesson 4: Making the Moves

Let’s draw and describe translations, rotations, and reflections.

### 4.1: Reflection Quick Image

Here is an incomplete image. Your teacher will display the completed image twice, for a few seconds each time. Your job is to complete the image on your copy.



### 4.2: Make That Move

Your partner will describe the image of this triangle after a certain **transformation**. Sketch it here.



### 4.3: A to B to C

Here are some figures on an isometric grid.



1. Name a transformation that takes Figure $A$ to Figure $B$. Name a transformation that takes Figure $B$ to Figure $C$.
2. What is one **sequence of transformations** that takes Figure $A$ to Figure $C$? Explain how you know.

#### Are you ready for more?

Experiment with some other ways to take Figure $A$ to Figure $C$. For example, can you do it with. . .

* No rotations?
* No reflections?
* No translations?

### Lesson 4 Summary

A move, or combination of moves, is called a **transformation**. When we do one or more moves in a row, we often call that a **sequence of transformations**. To distinguish the original figure from its image, points in the image are sometimes labeled with the same letters as the original figure, but with the symbol $​^{′}$ attached, as in $A^{′}$ (pronounced “A prime”).

* A translation can be described by two points. If a translation moves point $A$ to point $A^{′}$, it moves the entire figure the same distance and direction as the distance and direction from $A$ to $A^{′}$. The distance and direction of a translation can be shown by an arrow.
* For example, here is a translation of quadrilateral $ABCD$ that moves $A$ to $A^{′}$.
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* A rotation can be described by an angle and a center. The direction of the angle can be clockwise or counterclockwise.
* For example, hexagon $ABCDEF$ is rotated $90^{∘}$ counterclockwise using center $P$.
* 
* A reflection can be described by a line of reflection (the “mirror”). Each point is reflected directly across the line so that it is just as far from the mirror line, but is on the opposite side.
* For example, pentagon $ABCDE$ is reflected across line $m$.
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