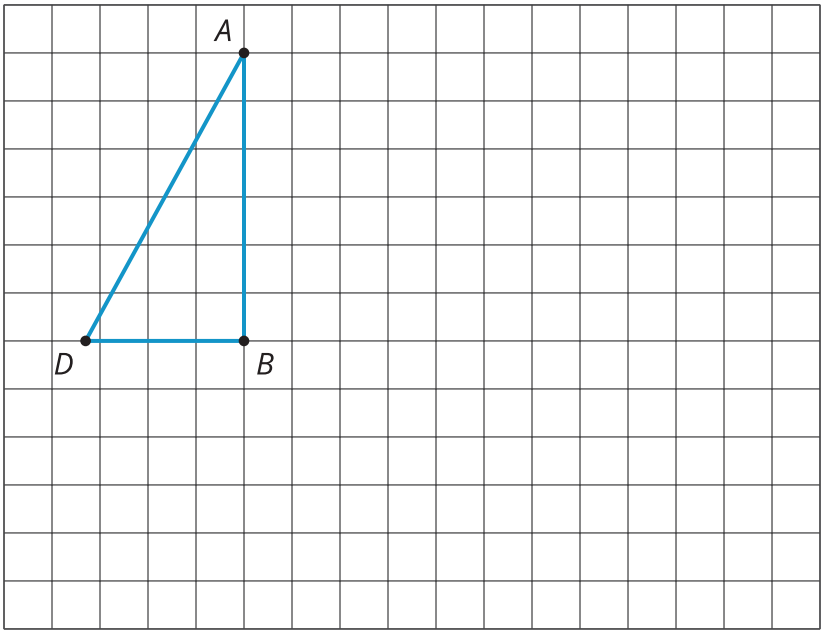
Making the Moves

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.



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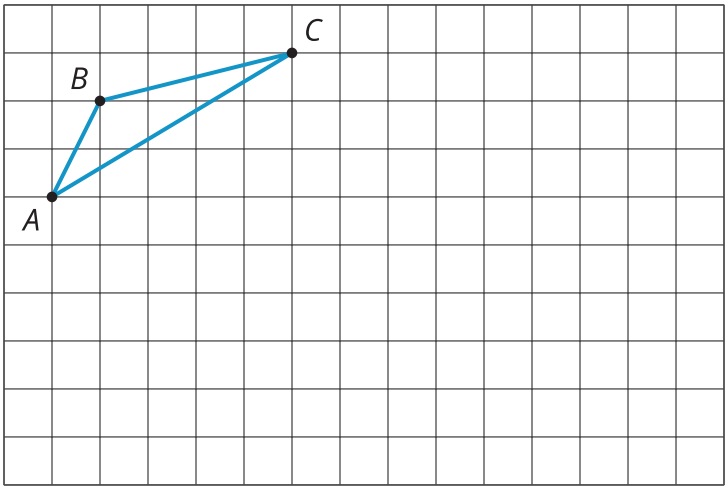
4.2 Make That Move

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



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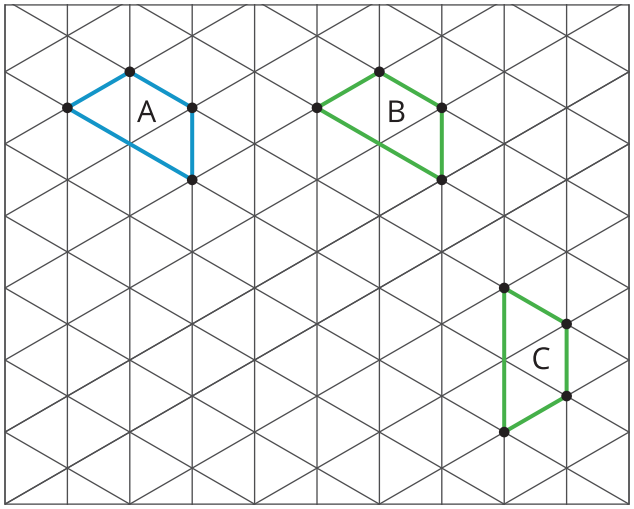
4.3 A to B to C

Here are some figures on an isometric grid.



1. Name a transformation that takes Figure A to Figure B.

2. Name a transformation that takes Figure B to Figure C.

3. 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 . . .

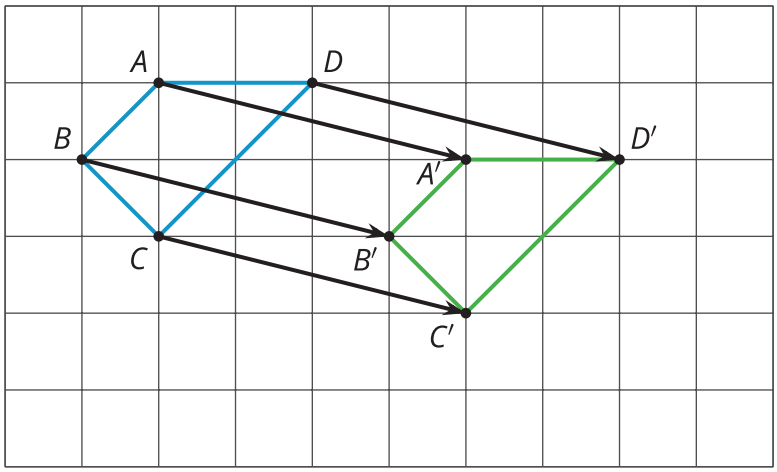
- No rotations?
- No reflections?
- No translations?

Lesson 4 Summary

A **transformation** is a translation, rotation, reflection, or dilation, or a combination of these. To distinguish an 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").

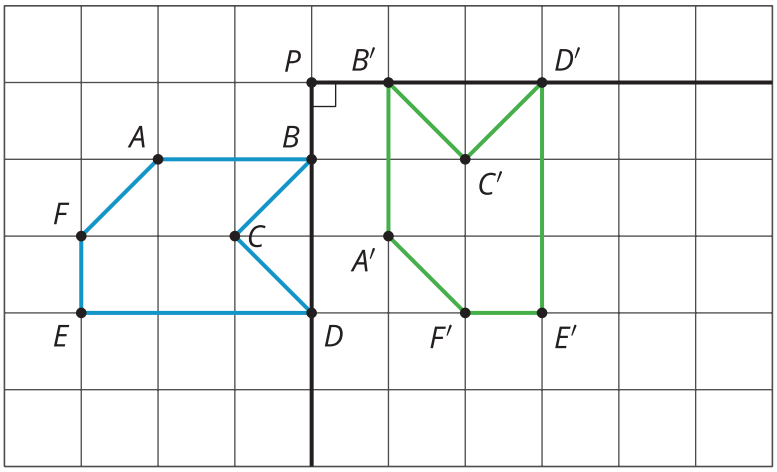
- A translation can be described by two points. If a translation moves point A to point A', it moves the entire figure the same distance and direction as the distance and direction from A to A'. The distance and direction of a translation can be shown by an arrow.

  For example, here is a translation of quadrilateral $ABCD$ that moves A to A'.



- 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.



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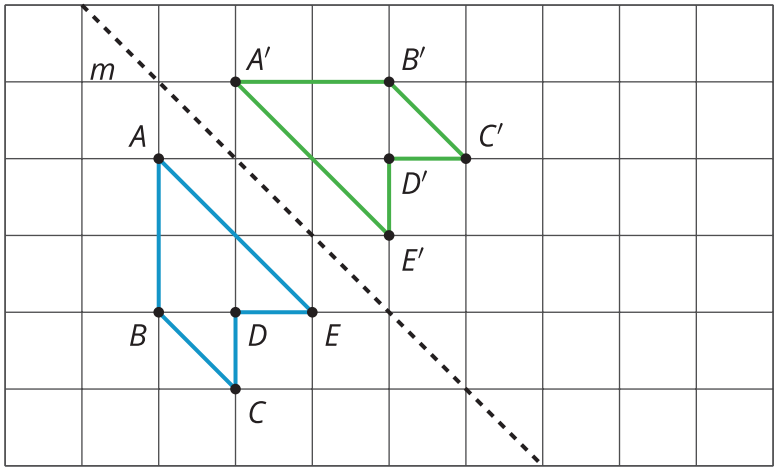
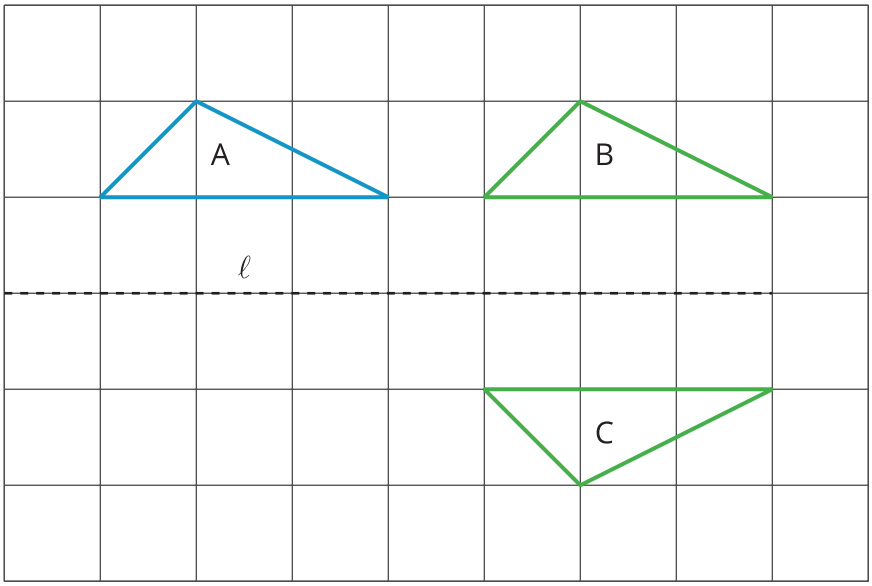
- A reflection can be described by a line of reflection (the "mirror"). Each point is reflected directly across the line so that it is just as far from the mirror line, but is on the opposite side.

  For example, pentagon $ABCDE$ is reflected across line m.



When we do one or more moves in a row, we often call that a **sequence of transformations**. For example, a sequence of transformations taking Triangle A to Triangle C is to translate Triangle A 4 units to the right, then reflect over line ℓ.

There may be more than one way to describe or perform a transformation that results in the same image. For example, another sequence of transformations that would take Triangle A to Triangle C would be to reflect over line ℓ, then translate Triangle A′ 4 units to the right.