Draft playlist template:

MGSE8.G.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

Learning Goals:

- SWBAT recall and use rotations, reflection, translations, and dilations
- SWBAT compare two-dimensional figures and describe the transformation that exhibits the similarity between them
- SWBAT compare two-dimensional figures and describe the sequence of transformations

Resource drop:

- **Khan Academy on transformations**
- **GO Math: Unit 4**

Standard	Descriptor	Taught	Reinforced
CC.8.G.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	SE: 281–282, 287–288, 293–294, 297–300, 316–317, 318, 321–323, 324	SE: 283–284, 289–290, 295–296, 301–302, 319–320, 325–326
CC.8.G.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	SE: 315–316, 317–318, 327–329, 330	SE: 319–320, 331–332, 332A–332B

Learning Goal 1: SWBAT recall and use rotations, reflection, and translations to produce congruent images.

Overview.

- Translations, rotations, and reflections produce a figure that is **congruent** to the original.
- Dilation produces a figure that is **similar** to the original.

In this module, you will apply transformations to points and shapes, and describe the transformations which map a shape onto its image.

Direct instruction.

- Translation
  - Determining a translation

- Translating a triangle
- Reflection
  - Reflecting a point across the *x*-axis
  - Reflecting a quadrilateral across the *x*-axis
  - Reflecting across a diagonal.
- Rotation
  - Rotating points
  - Rotating shapes

Additional learning materials.

Independent practice.

- Student Book: p.310: #5

Application activity.

Consider each of the following questions, then write your answer in the discussion forum. Explain your thinking clearly.

Sophie makes the following statement:

"A 270^{o} rotation is the same as a 90^{o} rotation."

Do you agree or disagree with Sophie's statement? Explain.

The point $(-a, b)$ undergoes a rotation of 90^{o} about the origin and moves to the point (b, a). Was the point rotated clockwise or counterclockwise? Explain how you arrived at your answer.

Discussion forum.

Check for understanding.

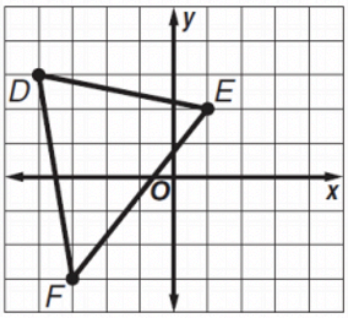
Rectangle $QRST$ is translated, and point Q' (the image of Q) has coordinates $(-6, -1)$.

If the coordinates of the original vertices are $Q\ (-8, 4)$, $R\ (-8, 2)$, $S\ (-3, 2)$, and $T\ (-3, 4)$, what are the coordinates of T'?

a. $(-5, 9)$
b. $(-1, -1)$
c. $(-1, 9)$
d. $(-8, 2)$

ΔDEF, shown at right, is translated and the coordinates of F' (the image of F) are $(2, -8)$. Find the coordinates of D'.

a. $(-9, 2)$
b. $(1, -8)$
c. $(-8, 1)$
d. $(-4, -3)$



Find the image of B (0, -3) after a 90° clockwise rotation about the origin.

a. (3, 0)

b. (-3, 0)

c. (0, 3)

d. (0, -3)

The point X (3, 6) is translated –7 units vertically and 3 units horizontally, then reflected in the line $y = 0$. Which of the following will be the coordinates of X'', the image of X, after this translation?

a. $(-4, -9)$ **b.** $(6, 1)$ **c.** $(-6, -1)$ **d.** $(4, 9)$

(Student Reflection)
Data + learning reflection

(Additional resources)
If need additional support

Learning Goal 2: SWBAT compare two-dimensional figures and describe the transformation that exhibits the similarity between them

Overview.

- Translations, rotations, and reflections produce a figure that is **congruent** to the

original.

- Dilation is a transformation which preserves the **shape** of the original figure, but changes its **size**. You can think of it almost like a "zoom in/out" feature, which enlarges or reduces the figure.
- The **center of dilation** is the fixed point where the lines connecting corresponding parts of the figure and its image intersect.
- The **dilation factor (scale factor)** describes how much the figure is enlarged or reduced.
- Dilation produces a figure that is **similar** to the original.

Direct instruction.

- Dilations and properties (video)
  - Dilations and their properties

Additional learning materials.

- Student book p. 317: **Finding a scale factor.**

Independent practice.
After Khan video:

- Khan Academy practice (properties of dilation)
- Khan Academy practice (scale factors)

After additional materials:

- Student Book: p. 310: #2, #6
- Student Book: p. 317: #7, #8

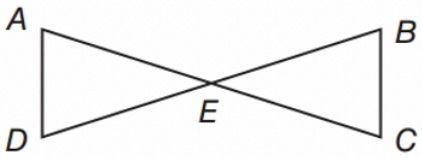
Application activity.
Student Book: p. 319 (table at the bottom)

Discussion forum.

Check for understanding.

Critical Thinking A triangle has vertices $A(-5, -4)$, $B(2, 6)$, and $C(4, -3)$. The center of dilation is the origin and $(x, y) \rightarrow (3x, 3y)$. What are the vertices of the dilated image?

In the diagram below, ΔAED ≅ ΔBEC. Which transformation will map ΔAED onto ΔBEC?



a. Reflection over a horizontal line through point E.

b. 90° clockwise rotation about point E.

c. Reflection over a vertical line through point E.

d. 180° clockwise rotation about point E.

(Student Reflection)
Data + learning reflection

Learning Goal 3: SWBAT compare two-dimensional figures and describe the sequence of transformations

Overview

In this module you will apply multiple transformations to assess whether two 2-dimensional figures are similar or different. In this module you will…

- Watch a video demonstrating how you can do multiple transformations
- Practice stacking transformations
- Apply this knowledge to make comparisons
- Practice in Khan academy

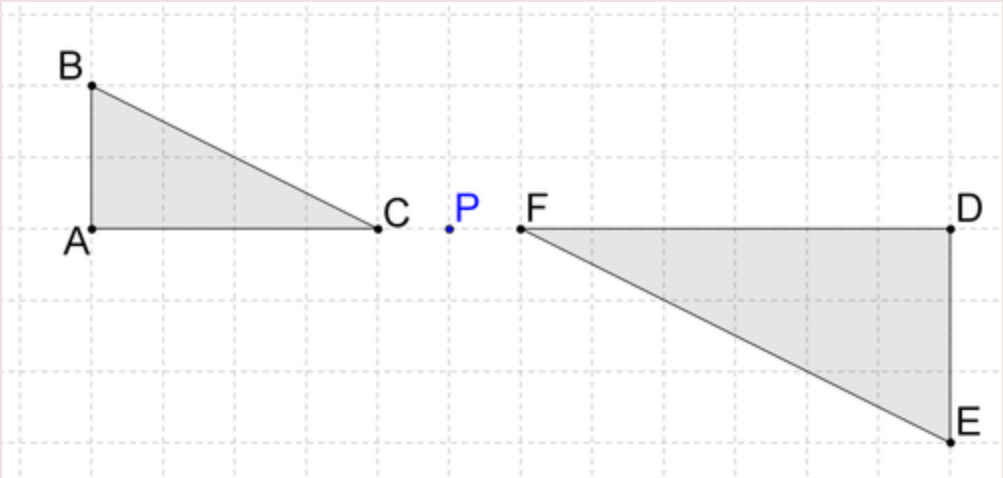
Direct instruction

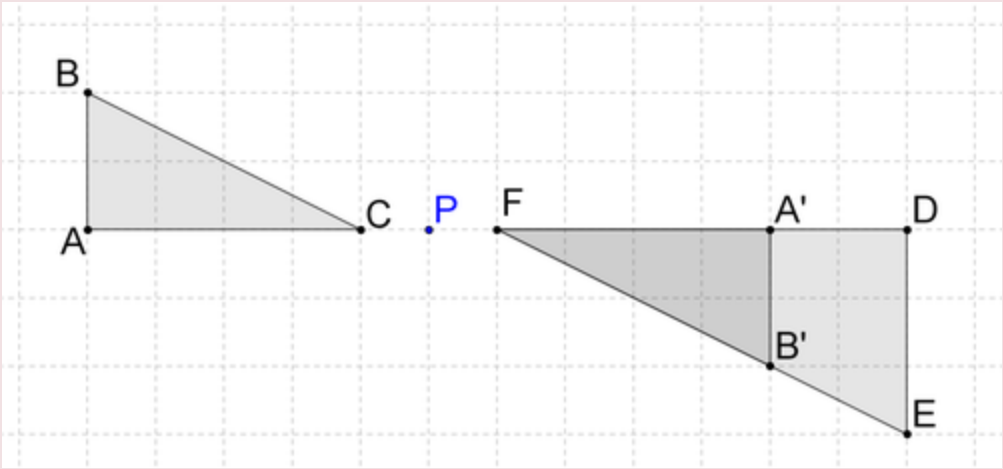
Key terms:

- Copy all of the ones from Goals 1-2
- Similar: two figures are similar if you can obtain one shape from a series of transformations from the other.
- Congruent: two figures which are same shape and same size are called congruent.

Key point: in this module you will work to compare two shapes and identify if they are similar or congruent by applying multiple transformations.

Example: are these shapes similar? What transformations did you have to apply?





Triangle BCD is rotated 180° clockwise and then dilated by a factor of 4 centered at the origin. The resulting image is triangle $B'C'D'$. Which statement about the two triangles is true?

A The area of $\triangle BCD$ is 4 times the area of $\triangle B'C'D'$.

B The perimeter of $\triangle BCD$ is 4 times the perimeter of $\triangle B'C'D'$.

C The corresponding sides of $\triangle BCD$ and $\triangle B'C'D'$ are congruent.

D The corresponding angles of $\triangle BCD$ and $\triangle B'C'D'$ are congruent.

Practice #1

Go MathPersonal Math Trainer 10.1

Education Elements

ΔABC is translated according to $(x-5, y+10)$ and then translated again by the vector $(x+3, y-6)$. Find a **single** translation vector that will map ΔABC onto ΔA"B"C". **Explain** how you found your answer.

Discussion.

Segment $\overline{MN}$ has endpoints $M\ (3, -5)$ and $N\ (-2, -2)$. Find the coordinates of $\overline{M''N''}$, the image of $\overline{MN}$ after it has been reflected over the line $y = x + 2$, and then translated according to $(x + 5, y - 3)$

If the transformations were performed in the reverse order (that is, if the translation were performed *first* and the reflection *second*) would $\overline{M''N''}$ have the same coordinates? Justify or explain your answer.

Formative Assessment
Must get above a __% to move on

(Student Reflection)
Data + learning reflection

Additional learning materials: OER, curriculum, teacher made resources

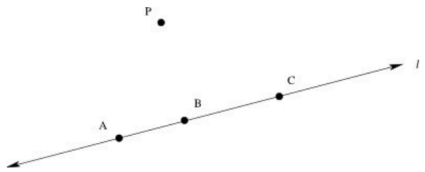
- Ideas, links and resources here

Practice

- Math problems or a practice passage or something similar

Application activity
Higher-order thinking/problem solving

Suppose we apply a dilation by a factor of 2, centered at the point P, to the figure below.



a. In the picture, locate the images A', B', and C' of the points A, B, and C under this dilation.

b. Based on your picture in part (a), what do you think happens to the line l when we perform the dilation?

c. Based on your picture in part (a), what appears to be the relationship between the distance A'B' and the distance AB? How about the distances B'C' and BC?

d. Can you prove your observations in part (c)?

http://tasks.illustrativemathematics.org/content-standards/tasks/602

(Discussion forum)
Related to the application activity

Formative Assessment
Must get above a __% to move on

(Student Reflection)
Data + learning reflection

(Additional resources)
If need additional support

POST ASSESSMENT