Dilate Family 1   Names:

In this activity you will dilate a point and compare the motion of the point to the motion of its dilated image.

DILATE A POINT

Begin by dilating a point and describing how the variables behave.

1. In your browser open geometricfunctions.org/links/dilate-family/. Go to **page 2.**
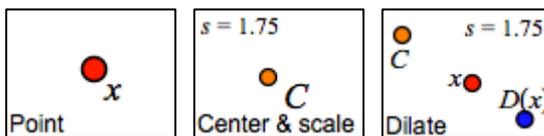
2. Use the first three tools $\boxed{\text{Point}}$ $\boxed{\text{Center \& scale}}$ $\boxed{\text{Dilate}}$ to create a dilate function. When you use the Dilate tool, be sure to match point x to point x.

3. Drag independent variable $\bullet_x$ on the screen and observe the behavior of $D_{C,s}(x)$.

4. Tap the scale factor s and change its value to 0.50.

Q1 Turn on tracing and drag x in to make a rectangle. Draw a picture of the result. Be sure to mark x, C, $D_{C,s}(x)$ in your picture.
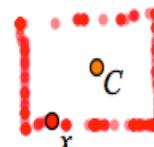
Q2 As you drag x, how does $D_{C,s}(x)$ behave? Fill in the blanks below.

| s = 0.50	Drag x left	Drag x up
Which way does $D_{C,s}(x)$ move?		
Which variable moves faster?		

Q3 Drag x to try to find fixed points of the dilate function. (Remember, a *fixed point* is a place where x and $D_{C,s}(x)$ come together at the same time.)

What did you find out?

Dilate Family 2 Names: _____

USE DIFFERENT SCALE FACTORS
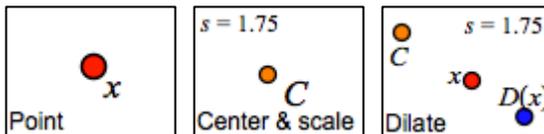
5. On **page 3** use [Point] [Center & scale] [Dilate] to create a dilate function.

6. Tap the scale factor $s = \boxed{1.75}$ and make its value 2.00.

Q4 Drag x left. Which way does $D_{C,s}(x)$ go, and how fast? Drag x up. Which way does $D_{C,s}(x)$ go, and how fast?

s = 2.00	Drag x left	Drag x up
Which way does $D_{C,s}(x)$ move?		
Which variable moves faster, x or $D_{C,s}(x)$?		
Which variable makes a longer trace, x or $D_{C,s}(x)$?		

Q5 Is there a connection between the speed of the variables and the lengths of their traces? If so, describe it.

Q6 Change the value of s to −1.00. What happens now when you drag x?

| s = −1.00	Drag x left	Drag x up
Which way does $D_{C,s}(x)$ move?		
Which variable moves faster?		
Which makes a bigger design?		

Q7 What do you think would happen if you make s = 0.00? Test your guess.

Prediction:	Actual result:

Creative Commons License CC-BY-NC-SA 4.0   2

CHALLENGES

7. On **page 4** construct a dilate function, restricting x to the red polygon and using the scale factor shown. Then adjust the center point so the dependent variable traces out the perimeter of the blue polygon. Mark the location of your center point in the space below.

8. **Pages 5, 6, and 7** are similar. Follow the directions on each page and mark your center points and scales below below.
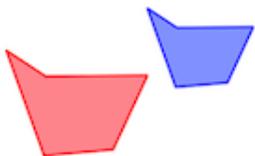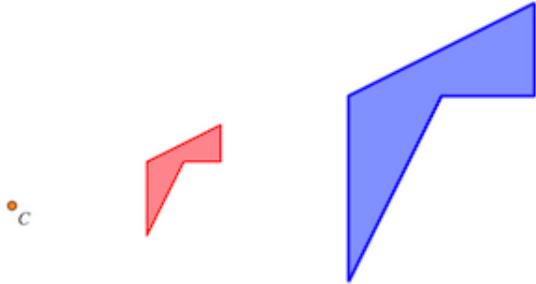
Page 4	Page 5
$s = 0.75$	
Page 6	**Page 7**
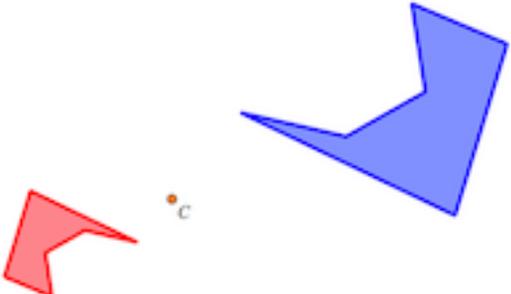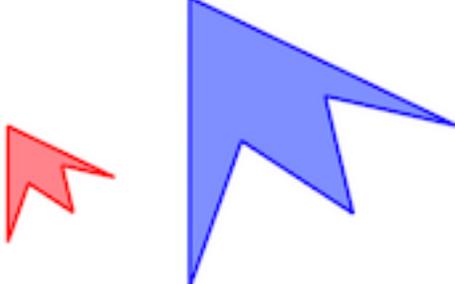
DILATION GAMES

9. On **page 8**, you can see independent variable *x,* center point *C,* and scale factor *s.* But the dependent variable $D_{C,s}(x)$ is hidden. Drag the yellow circle to show where you think $D_{C,s}(x)$ is hiding, and press *Check* to see if you were right. Then a new problem appears for you to try. Practice this game until you get it right every time.

10. Play the Dilation Games. (The link is below the sketch.) In each game your job is to find a different missing element. Keep track of your scores as you get better.

MORE CHALLENGES

11. **Pages 9, 10, and 11** contain more puzzles that you can use to extend your understanding of the dilate function.