Geometry Name _____

Scale It Up: A Scale Drawing Project

To culminate our study of Unit 8, we are going to celebrate by doing a scale drawing project. You will be encouraged to use your own picture to perform the geometric transformation of a **dilation**.

Notes Portfolio - What Is a Dilation?

Please watch the following video: https://www.youtube.com/watch?v=Fe_Qqt4zPkg

Or you can look up each of these vocabulary words online

(1) Define the following KEY VOCABULARY in your own words and/or by using relevant pictures.

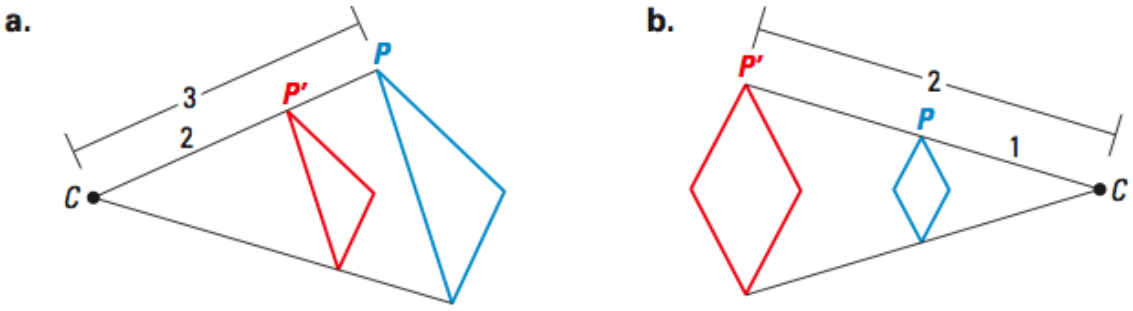
(a) Dilation:

(b) Reduction

(c) Enlargement

(d) Scale Factor

(2) Identify the dilation and find its scale factor

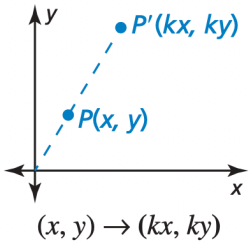


(3) Read through the following 2 methods

THE COORDINATE METHOD

Coordinate Rule for Dilations

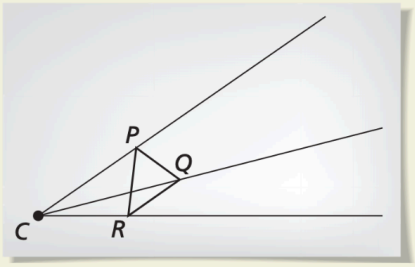
If $P(x, y)$ is the preimage of a point, then its image after a dilation centered at the origin (0, 0) with scale factor k is the point $P'(kx, ky)$.



$(x, y) \rightarrow (kx, ky)$

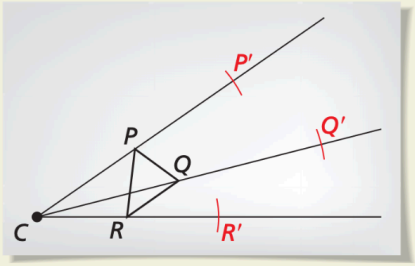
THE CONSTRUCTION METHOD:

Step 1



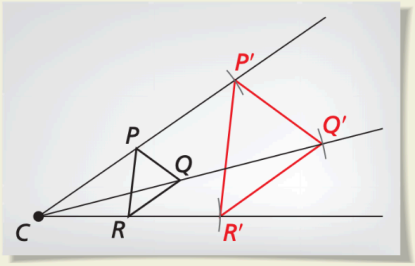
Draw a triangle Draw $\triangle PQR$ and choose the center of the dilation C outside the triangle. Draw rays from C through the vertices of the triangle.

Step 2



Use a compass Use a compass to locate P' on $\overrightarrow{CP}$ so that $CP' = 2(CP)$. Locate Q' and R' using the same method.

Step 3



Connect points Connect points P', Q', and R' to form $\triangle P'Q'R'$.

YOUR TASK:

- Summarize both methods.
- Explain which method you like better and why?
- Think about how you could adapt the compass method with only a ruler?

- NOTE: For the compass and protractor method, you may work through the Triangle Dilation construction on Delta Math and record the stages and observations in the space below.

DeltaMath Exercises: Please complete the following exercises on DeltaMath

Dilation Assignment	0%
? Dilation of a Point	0/5
? Find the Scale Factor	0/5
? Find the Scale Factor (Level 2)	0/5
? Create Scaled Drawings on a Grid (Level 1)	0/3
? Create Scaled Drawings on a Grid (Level 2)	0/3
? Constructing a Dilated Triangle	0/2
Due: Mar 11, 08:00 am	Mr. Benzel

Please record all shown work on the space provided on this page and the next. Note if you are in Honors, you are required to do Constructing a Dilated Triangle. Otherwise, it is optional.

Scale Drawing Project

Please follow the instructions below:

(1) Find a 4x6 inch comic, cartoon, character, logo etc. that you want to focus on. You will need a physical copy of this picture. It should be of a reasonably average level of difficulty drawing in color (pictures with details and words are encouraged.

To meet the requirements of a good grade, please do the following:

(2) Draw a grid on the original picture with squares that are 1 cm x 1 cm. Make sure that the lines are straight and that the lines form right angles. If the grid does not fit the picture exactly, place the picture on a white sheet of paper and extend the grid beyond the original picture.

(3) Number both of the axes so that you can locate the appropriate squares when drawing.

(4) You must use a scale factor that is **at least** 1:2 but is able to fit on the poster paper that you receive. You want to choose a scale factor such that you have a small but workable border.

(5) On the poster board, you want to draw a square for your scale factor, (i.e. if you chose a scale factor of 1:2.5, this means that you would make one square every 2.5 cm. Make sure the lines are straight and are forming right angles.

(6) Redraw the original design on the poster paper.

(7) Write a separate reflection on the back of the final product for how you chose your scale factor and the process you used.

To meet the requirements for an EXCELLENT GRADE please do the following IN ADDITION,

(8) Attempt to create and explain how you could make the scale drawing WITHOUT using the grid concept. (i.e. how can you create a scale drawing, using only a ruler and a compass?)

DRAFT IT/PLAN IT:

Before you get the graph paper and "poster graph paper" please make a rough sketch of your image and how you are going to do your scale drawing. Feel free to do as many rough draft sketches as you want.

RUBRIC OF EVALUATION:

Indicator	0-1 Point	2 Points	3 Points	4 Points
Effectiveness of Scale Drawing	Student fails to preserve the shapes and features of the original picture. It is clear that the level of precision is severely lacking and minimal to no thought was given in the planning of the scale drawing.	Student is sometimes able to preserve the shapes and features of the original picture while changing its size It appears that parts of the scale drawing are rushed and the presentation is inconsistent.	Student is able to preserve the shapes and features of the original picture while changing its size most of the time. There may be a few rushed parts, however there is an acceptable degree of precision.	Student is able to create a precise scale drawing with detailed thought. The student is able to use and explain scale drawing with multiple methods: ● Geometric tools ● Grid/coordinate system. Students at this level display a higher degree of precision through having creative ideas and more intricate details (i.e. narrower spacing in the coordinate grid)
Use of Scale and Proportion	Student fails to identify a scale factor and makes little to no effort in explaining how they used scale to produce the enlargement of their picture.	While student identifies a scale factor and attempts to use it, the student shows misunderstanding of scale factor by not using their scale factor correctly. The student chooses a scale factor that fails to fit their picture on the poster sized paper.	Student identifies and uses a scale factor to successfully preserve the picture **<u>most of the time.</u>** Evidence of proper use include: - Using Ratios/proportions - Labeling squares in appropriate intervals - Choosing a scale factor that fits on the poster sized paper with **minimal whitespace.** ****WHITESPACE** is defined as “deadspace” that is not part of the original postcard sized design**	Student consistently is able to use scale and proportion deliberately. The student is able to articulate how they used scale and proportions with multiple methods: ● Using a coordinate grid to create a scale drawing. ● Setting forth a scale factor with using only Geometric tools without the assistance of the grid. Additionally, a scale factor is deliberately chosen such that the design can fit on the poster with **NO whitespace.**

Learning and Reflection	Student gives little to no effort in learning the concept of dilation. This is evident by: ● Brief answers to the Dilation notes questions ● No statement of intent or reflections to accompany the picture	While student attempts to learn the material of dilation, there are apparent lapses in the students research as evident by: ● Incomplete Dilation notes. ● A brief statement of intent that only mentions the scale factor that was used. ● Major inaccuracies in the material	Student shows evidence of adequate learning and reflection as evident by: ● Accurate work and definitions on the Dilation notes. ● A statement of intent that mentions the scale factor and the process in which scale factor was used to create the scale drawing. ● A statement of intent that shows a minor inaccuracy but no major conceptual errors.	Student creates a deliberate and thorough reflection and note taking sheet as evident by: ● Thorough definitions and worked out examples. ● Writing a statement of intent that includes not only how the scale factor is used but also how a scale factor is to be interpreted. Additionally, the student may write out how they arrived at the scale factor that they used. ● Student is reflective in how their scale drawing was created. They may mathematically justify why the inaccuracies may have occurred if there were inaccuracies.
Creativity:	Student does an extremely basic design (i.e. a square or rectangle that is a single color)	Student does a combination of basic design (i.e. a combination of multiple basic Geometric shapes)	Student chooses a <u>relevant</u> picture or logo of their chooses [In terms of relevant, you will want to ask your teacher whether your picture is sufficient]	Student chooses a high quality picture that is complex and interesting [THINK WOW FACTOR!]

COMMENTS: