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| **Synopsis of high-quality task:**  Teacher will show students a picture of multiple car logos that they might be familiar with. Students will describe how these car logos can be redrawn using understanding of congruency and similarity to show that a sequence of rotations, reflections, dilations, and/or translations can occur. With a partner, student will then create their own logo and share out using detailed geometric language.  **Anticipated student time spent on task:** 45 minutes  **Student task structure:** Partner work |
| [**Math Content Standards and Practices:**](http://www.doe.mass.edu/frameworks/math/2017-06.pdf)  **8.G.A.2** Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations. Given two congruent figures, describe a sequence that exhibits the congruence between them.  **8.G.A.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.  **SMP3** Construct viable arguments and critique the reasoning of others.  **SMP4** Use appropriate tools strategically.  **SMP7** Look for and make use of structure. |
| **Prior Knowledge:**  **4.G.A.3** Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry |
| **Connections to the real-world:**  Students will be interested in the lesson and be able to make a connection to seeing car logos every day. Students are surrounded by logos that marketing teams specifically design in order to attract customers. |
| **Mastery Goals:**  Learning Objective:  Students will be able to describe a sequence of rotations, reflections, and translations that preserve congruency of a figure.  Students will be able to describe a sequence of rotations, reflections, and translations that preserve congruency of a figure.  Language Objective:  Students will be able to summarize in writing and orally a sequence of motions. |
| **Teacher instructions**   * Teacher will project the following picture of car logo’s (or print copies for students). Collage of car logos * Teacher will ask students to look at the logos and pick one to write about. Students should summarize the symmetry they see, what figures stay congruent and/or similar to each other. Teacher should direct students to write their summary on their worksheet (see attached). * Teacher should check in with students that they are understanding that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations. Given two congruent figures, describe a sequence that exhibits the congruence between them. In additional students should also 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. * While students are working teacher will circulate and be checking in with students and asking students if they would like to share their sequence description with the class. * Teacher will then call on volunteers to read their summary of transformations of the car logo choose. * Next students will work with a partner and create their own car logos (Questions #2 on the worksheet). While designing students should create a logo that has symmetry, reflections, rotations, translations, and/or dilations. Students will summarize how congruency is preserved or how the figures are similar. Students can use crayons, markers, or colored pencils to create their logo. * Teacher will then have partners share out their car logos and explain how the figures are congruent or similar. * Last, teacher will ask students to answer the last question on the worksheet regarding why car companies care so much about making their logos appear symmetrical and have a class discussion regarding this topic. |
| **Instructional Materials/Resources/Tools:**  Include:   * Computer and Projector * Worksheet for students (see attached) * Colored pencils, markers, or crayons |
| **Accessibility and Supports:**  **Potential sentence starters:**  The figure in my logo can be reflected by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  The figure in my logo can be rotated by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  The figure in my logo can be translated by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  The figure in my logo can be dilated by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **Key academic vocabulary:** congruent, similar, reflections, rotations, translations, dilations, and sequence |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Car Logos**

1. Choose one car logo from the choices projected and describe how within the logo one figure is similar or congruent to another figure by the sequence of rotations, reflections, translations and/or dilations. Describe any symmetry in the logo.

2. Create your own logo and describe the symmetry and the sequence of rotations, reflections, translations and/or dilations.

3. Why do you think car companies care so much about making their logos appear symmetrical?

**Student Sample Work**



