

# AREA AND PERIMETER

## Overview

Students will explore the geometric abstract work of painter Seonglan Kim Boyce in order to solve real-world math problems involving perimeter, area, and volume.

## National Standards

- VA:Re9.1.6a Develop and apply relevant criteria to evaluate a work of art.
- VA:Cr2.1.6a Demonstrate openness in trying new ideas, materials, methods, and approaches in making works of art and design.
- CCSS.MATH.CONTENT.6.G.A.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
- CCSS.MATH.CONTENT.6.G.A.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas  $V = l w h$  and  $V = b h$  to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
- CCSS.MATH.CONTENT.6.G.A.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
- CCSS.MATH.CONTENT.6.G.A.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

## Materials/Works of Art

*Rulers, pencils, erasers*

*Images and video of Seonglan Kim Boyce*

## Discussion

Minimal abstract paintings are works of art that aim to capture the essence of a subject using only essential forms. Minimalist artists often use simplified geometric forms along with mathematical systems to develop the composition of a work of art. Seonglan Kim Boyce's minimalist paintings are inspired by open and unoccupied space. Use the following questions to discuss the minimalist abstract paintings of Seonglan Kim Boyce with students.



## Discussion Continued

Describe and discuss the shapes and forms you observe in the painting.

Describe and discuss the use of positive and negative space in an abstract composition.

Define and discuss perimeter, area, and volume using the works of art. What mathematical formulas are used to calculate the measurements of shapes?

## Activities

- Print images of works of art and use rulers to measure the dimensions of each painting or composition.
- Measure the geometric forms in each composition and calculate the area and volume of the forms.
- Use mathematical formulas to calculate the area of the negative space within a composition.

## Reflection

How do minimal abstract artists utilize mathematical concepts in creating a composition?

## Extension

- Use the scale factor formula to change the scale of a shape or composition.
- Create or plot a composition of geometric shapes in a plane from a boundary representation or data set.
- Explore irregular or organic shapes and the mathematical formulas used to calculate their dimensions.

