Sherlock Gnomes

Math and Art, 6th Grade

Teacher Guide

Objective

Students will be able to understand the relationship between mathematical properties and visual elements in a work of art.

Introduction

Movie Marketing: A movie's Marketing Team performs the important role of making sure people are aware of the movie and are excited to go see it. The *Sherlock Gnomes* Marketing Team includes many departments, including Market Research, Publicity, and Digital Marketing. The focus of this lesson is the In-Theater Marketing department, which is responsible for producing and distributing advertisements that are displayed in movie theaters. Advertising at movie theaters is important because the Marketing Team wants to make sure they are reaching people who will go out and see the movie, so who better to advertise to than people who already like going to the movies?! This lesson follows the production of large-scale cardboard cutouts of the *Sherlock Gnomes* Goon character that can be displayed in movie theater lobbies across the country.

Artists Use Math: Artists must understand sizing and proportion to ensure that the characters they are drawing are accurate and consistent. Without this understanding, characters become stretched or distorted which can make the characters not look like themselves. Before an artist can think about color or details, they must first perform mathematical calculations to make sure that all of their characters' arms, legs, torsos, heads, and hats are the right size. This type of math is important no only for the artists working on the actual movie, but also for the artists who produce marketing materials that vary dramatically in size. Artists are responsible for creating not only movie posters that can hang on a wall, but also small website pop-ups and giant eye-catching billboards.

Activities

Discuss: Play the video, "How to Draw Sherlock" from 0:00 to 0:58. Ask students to pay close attention to the animator's discussion of proportions. Ask: "what does the artist mean when he references the proportion of the hat?" Share with students that the artist is making sure that Sherlock's hat is the correct size when compared to the size of his face.

List: Working in groups, have students create a list of objects that are similar but their different proportions make them unique. Eg: car/limousine, shorts/pants, loaf of bread/baguette. Warn students that even though two items may have different sizes, their proportions may be the same. Eg: kitten/cat, tennis ball/basketball.

Distribute Worksheet: *Worksheet may be completed as a whole-class activity or can be assigned to students using the differentiated options on the next page.*

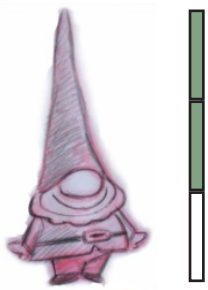
Write an Equation: Read the prompt about the cardboard Goon aloud. On the board, create a table of objects and their numerical values, using a variable for the unknown value.

Hat	12
Body	x
Total	18

Write the following equation: "Hat + Body = Total"
Then, substitute the values: "12 + x = 18"

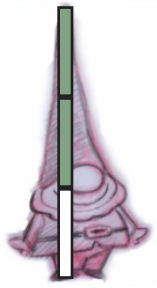
Solve the Equation: Subtract 12 from both sides of the equation to give you the solution $x = 6$. Make sure that students have the correct answer or they will encounter difficulties in the tasks that follow.

Write a Ratio: First, complete the ratio with the values, 12 and 6. Then, divide both of these values by 6 to create a ratio of 2:1.



Draw: Share the following 2 strategies for drawing with proportion:

> Ruler: Draw a 1 inch vertical line for the body. Multiply the length of this line by 2 to get the length of the hat (1 x 2 = 2). Draw a 2 inch line on top of the 1 inch line. The 2 inch line is the length of the hat.
>
> Object: Draw a short vertical line for the body. Measure the line using an object like your finger or a book. Use this measurement twice to draw a vertical line that is two times as long as the line for the body. This longer line is the length of the hat.



Draw: Have the students repeat this process but change the length of the body line each time. They should end up with a variety of Goons that are different sizes but all share the same proportions.

Draw: Play the video, "How to Draw a Goon" and ask students to follow along as the artists draws each of the features. Make sure the students use the proportions they set up to create hats and bodies that are appropriately sized. If you wish, pause the video to figure out the proportions of the face to the torso or the torso to the legs.

Goal Set: Ask students to assess their work (both math and art) and set a goal for future learning. Prompt and scaffold as appropriate, but provide the space for students to set their *own* goals.

Duration

1 hour

Standards

Common Core State Standards, Mathematics
6.RP.A.1
6.EE.B.6

National Core Arts Standards
VA:Cr2.1.6a

Differentiation

For advanced students, distribute the "Advanced" worksheet. This worksheet features more complex numbers and less prompting. *These more complex numbers will still result in the same 2:1 ratio. Body height will be 90 in. or 7.5 ft.*

Vocabulary

Tier 3
Ratio
Proportion

Sherlock Gnomes

Name _____

Math and Art, Worksheet 6-A

To advertise for the premiere of *Sherlock Gnomes*, Paramount will be sending 18-foot cardboard cutout Goons to movie theaters across the country. The Goons will be sent in 2 pieces: the hat and the body. The cardboard company is printing bodies that are *x* feet tall. They are also printing hats that are 12-feet tall.

1. Write an **equation** to describe this situation.

2. How tall will the Goon bodies be?

3. Use the cardboard cutout measurements to describe the **ratio** relationship between the Goon's hat and body.

The ratio of the height of the hat to the height of the body is _____.

4. Sketch the Goon below using the hat/body **ratio** from above to create proper **proportions**.

Challenge: Draw multiple Goons in different sizes.
*Remember to use the **ratio**!*

Sherlock Gnomes

Name _____

Math and Art, Worksheet 6-B

To advertise for the premiere of *Sherlock Gnomes*, Paramount will be sending 22.5-foot cardboard cutout Goons to movie theaters across the country. The Goons will be sent in 2 pieces: the hat and the body. The cardboard company is printing bodies that are *x* feet tall. They are also printing hats that are 180-inches tall.

1. Write an **equation** to describe this situation.

2. How tall will the Goon bodies be?

3. Use the cardboard cutout measurements to describe the **ratio** relationship between the Goon's hat and body.

4. Sketch the Goon below using the hat/body **ratio** from above to create proper **proportions**.

   Challenge: Draw multiple Goons in different sizes.