

### Lesson #1: Introduction to Scale and Ratio

#### Objectives

##### Students will be able to...

- Understand that a ratio is a comparison between two numbers.
- Understand that a proportion is an equivalent relation between two ratios.
- That scale drawings are ratios.

#### Common Core Standards

Problem Solving and Critical Thinking 5.1  
Responsibility & Flexibility 7.5  
CTE Pathway D3.1, 3.2  
Leadership & Teamwork 9.3  
RSIT 11-12.2  
RLST 11-12.2

#### Materials

YouTube video [https://www.youtube.com/watch?v=X\\_tH\\_9JKodY&t=72s](https://www.youtube.com/watch?v=X_tH_9JKodY&t=72s)  
Scale Drawings Using Ratios Worksheet  
Solving Proportions Worksheet

#### Lesson Sequence

- Introduce that a ratio is a comparison of two like quantities that are expressed in the same units of measure. A ratio takes on the form of a fraction; however, the final form of a ratio is not left as a fraction. It is written as a statement of the ratio relationship (this to that). (5 minutes).
- Watch the *YouTube video* on scale drawings using ratios.  
[https://www.youtube.com/watch?v=X\\_tH\\_9JKodY&t=72s](https://www.youtube.com/watch?v=X_tH_9JKodY&t=72s) (7 minutes)
- Work together as a class to complete *Scale drawings using ratios worksheet*. (15-20 minutes)
- Pass out *Solving Proportions Worksheet* and collect before students leave.

**Assessment**

Check for understanding during whole class work. Grade the solving proportions worksheet to assess student knowledge on finding proportions.

**Accommodations/Modifications**

Multiplication Chart  
Calculator  
One-on-One Support  
Check for Understanding

**Scale Drawings using Ratios Worksheet**

In a scale drawing or a scale model, all the dimensions of the actual object are reduced or enlarged proportionally.

A map is a scale drawing in which actual distance is reduced.

The towns of Hagerstown and Annapolis are on a map with a scale of 1 cm = 24 miles. If the map distance between Hagerstown and Annapolis is 4 cm, what is the actual distance?

$$\frac{cm}{mi} \quad \frac{1}{24} = \frac{4}{x}$$

A graphic artist is creating an advertisement for this cell phone. If she uses a scale of 5 inches = 1 inch, what is the length of the cell phone on the advertisement?

$$\frac{Drawing}{Actual} = \frac{5}{1} = \frac{x}{4}$$

The actual distance between two towns is 175 km. If the distance between them on a map is 7 cm, what is the map scale?

$$\frac{Drawing}{Actual}$$

**Scale** drawing has a scale of 3 in: 10ft.

**Drawing:** 24in.

**Actual:** 25ft.

**Scale** model has a scale of: ½ in: 3ft.

**Drawing:** 4.5in.

**Actual:** 25.5ft.

# **BUILDING INDUSTRY TECHNOLOGY ACADEMY: YEAR ONE CURRICULUM**

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**Remember**  $\frac{\text{Drawing}}{\text{Actual}}$

1. The Statue of Liberty is approximately 305 feet tall. A scale model of the statue is 5 inches tall. The scale of the model is 1 in = \_\_\_\_\_ ft.
2. The right arm of the Statue of Liberty is 42 feet long. How long is the right arm of the Statue of Liberty model described in question 1?
3. The diameter of the steering wheel of the actual car is 15 inches. What is the diameter of a toy car's steering wheel if the toy is a 1:40 scale model of the real car?  
A.  $\frac{3}{8}$  in                      B.  $1\frac{1}{2}$  in                      C.  $\frac{1}{2}$  in                      D.  $2\frac{2}{3}$  in
6. The diameter of the toy car's tire is  $\frac{5}{8}$  in. What is the diameter of the tire of the actual car?  
A.  $12\frac{1}{2}$  in                      B. 25 in                      C. 16 in                      D. 64 in
7. On a scale drawing, a 14-ft room is depicted as 3.5 inches. What is the scale of the drawing?  
A. 1:48                      B.  $\frac{1}{4}$ :14                      C. 1:4                      D. 1:56
8. On a scale drawing of a computer component,  $\frac{1}{4}$  in = 4 in. On the drawing, a piece is  $\frac{3}{8}$  in long. How long is the actual piece?  
A. 1.5 in                      B. 6 in                      C. 3 in                      D. 7.5 in
9. A scale drawing has a  $\frac{1}{4}$ inch scale. The width of a 12-foot room is going to be increased by 4 feet. How much wider will the room be on the drawing?  
A.  $\frac{1}{4}$  in                      B. 1 in                      C.  $\frac{1}{2}$  in                      D. 4 in

Solving Proportions Worksheet

1. What should the JOLLY GREEN GIANT receive?

$\overline{6}$   $\overline{5}$   $\overline{18}$   $\overline{11}$   $\overline{16}$   $\overline{15}$   $\overline{52}$   $\overline{18}$   $\overline{70}$   $\overline{2}$   $\overline{80}$   $\overline{18}$   $\overline{9}$   $\overline{12}$   $\overline{13}$   $\overline{80}$   $\overline{20}$   $\overline{30}$   $\overline{1}$   $\overline{18}$

2. Why did it take the GOAT more than 3 hours to finish a 20-page book?

$\overline{5}$   $\overline{18}$   $\overline{21}$   $\overline{8}$   $\overline{9}$   $\overline{12}$   $\overline{16}$   $\overline{6}$   $\overline{24}$   $\overline{4}$   $\overline{18}$   $\overline{20}$   $\overline{3}$   $\overline{60}$   $\overline{5}$   $\overline{10}$   $\overline{16}$   $\overline{7}$   $\overline{20}$   $\overline{3}$

Solve each proportion and find your answer in the code. Each time the answer appears, write the letter of the exercise above it. Show your work.

Ⓘ  $\frac{2}{5} = \frac{12}{n}$

Ⓢ  $\frac{3}{4} = \frac{9}{n}$

Ⓖ  $\frac{6}{2} = \frac{21}{n}$

Ⓞ  $\frac{10}{4} = \frac{n}{6}$

Ⓨ  $\frac{5}{15} = \frac{n}{9}$

Ⓣ  $\frac{12}{8} = \frac{n}{4}$

Ⓤ  $\frac{2}{n} = \frac{5}{25}$

Ⓐ  $\frac{33}{n} = \frac{11}{3}$

Ⓛ  $\frac{49}{n} = \frac{7}{10}$

Ⓥ  $\frac{n}{6} = \frac{6}{9}$

Ⓩ  $\frac{n}{4} = \frac{18}{72}$

ⓗ  $\frac{n}{2} = \frac{50}{20}$

Ⓦ  $\frac{14}{n} = \frac{7}{4}$

Ⓔ  $\frac{8}{12} = \frac{12}{n}$

Ⓑ  $\frac{n}{13} = \frac{4}{1}$

Ⓡ  $\frac{24}{6} = \frac{n}{5}$

Ⓝ  $\frac{n}{10} = \frac{40}{25}$

Ⓟ  $\frac{24}{n} = \frac{30}{100}$