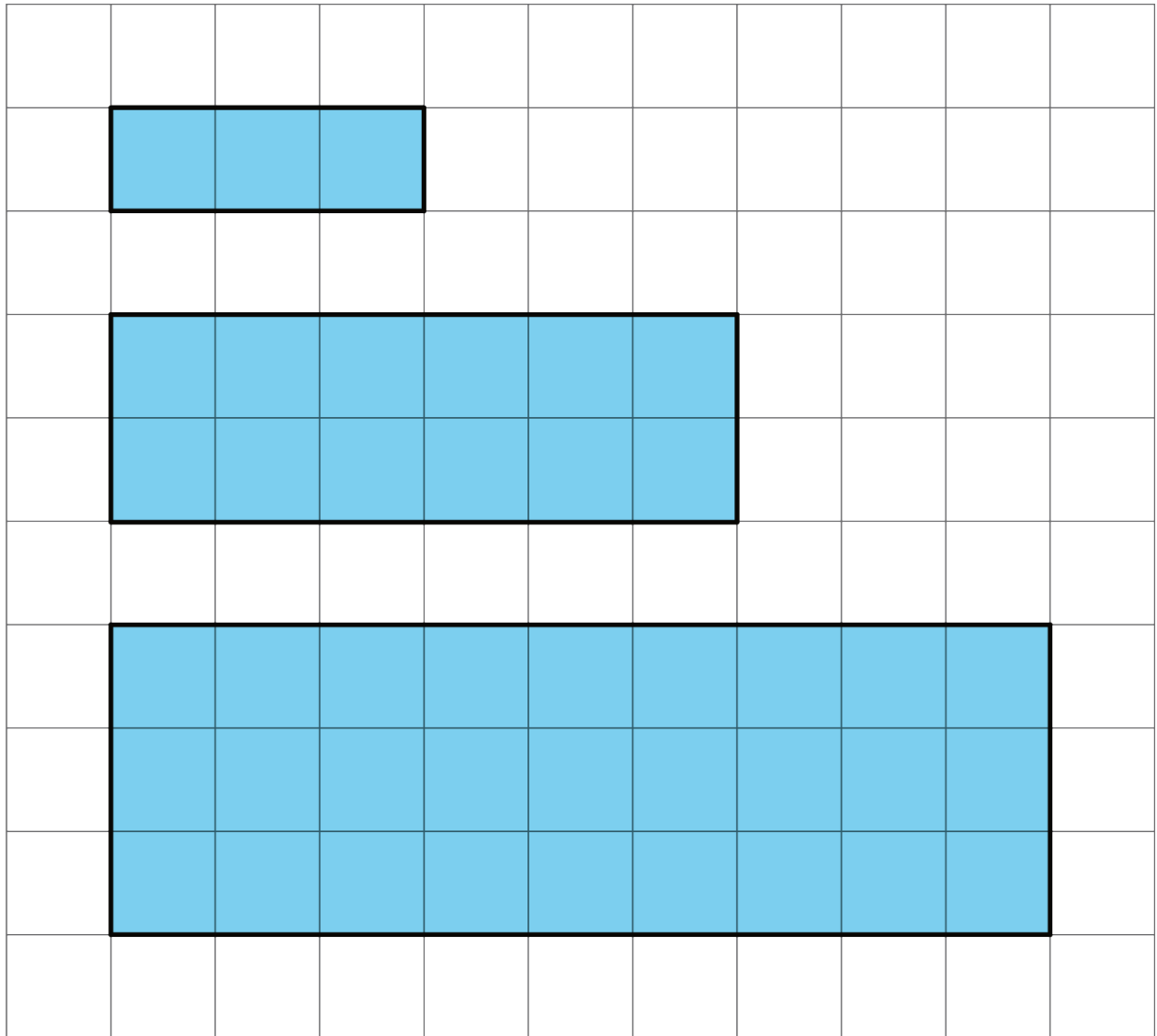# Unit 5 Lesson 5: Comparing Relationships with Equations

1 Notice and Wonder: Patterns with Rectangles (Warm up)

Student Task Statement

Do you see a pattern? What predictions can you make about future rectangles in the set if your pattern continues?

2 More Conversions

Student Task Statement

The other day you worked with converting meters, centimeters, and millimeters. Here are some more unit conversions.

1. Use the equation $F = \frac{9}{5}C + 32$, where F represents degrees Fahrenheit and C represents degrees Celsius, to complete the table.

temperature ($^\circ$C)	temperature ($^\circ$F)
20	
4	
175	

2. Use the equation $c = 2.54n$, where c represents the length in centimeters and n represents the length in inches, to complete the table.
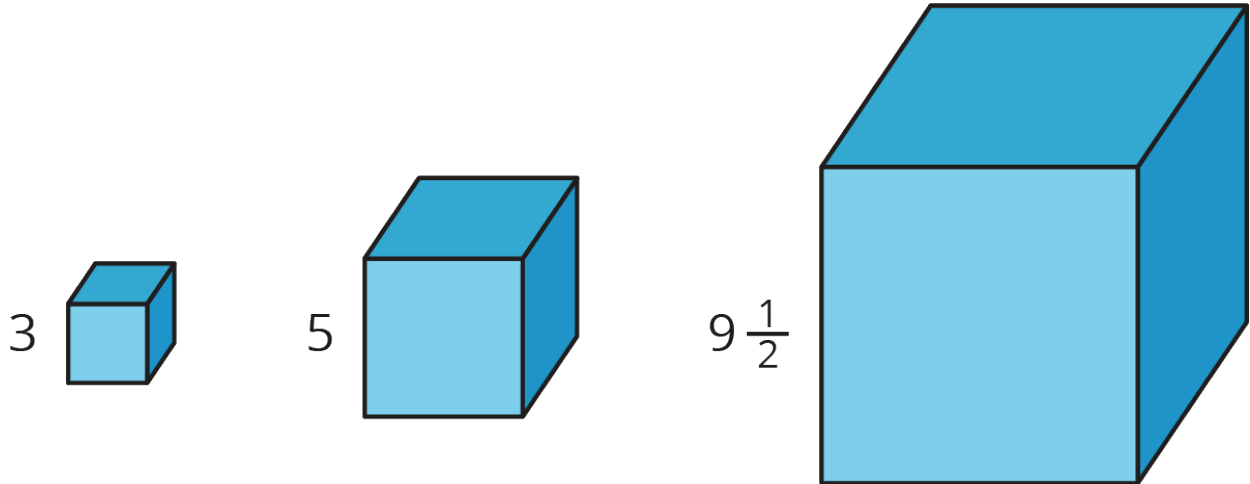
length (in)	length (cm)
10	
8	
$3\frac{1}{2}$	

3. Are these proportional relationships? Explain why or why not.

3 Total Edge Length, Surface Area, and Volume

Student Task Statement

Here are some cubes with different side lengths. Complete each table. Be prepared to explain your reasoning.

3   5 $9\frac{1}{2}$

1. How long is the total edge length of each cube?

side length	total edge length
3	
5	
$9\frac{1}{2}$	
s	

2. What is the surface area of each cube?

side length	surface area
3	
5	
$9\frac{1}{2}$	
s	

3. What is the volume of each cube?

side length	volume
3	
5	
$9\frac{1}{2}$	
s	

4. Which of these relationships is proportional? Explain how you know.

5. Write equations for the total edge length E, total surface area A, and volume V of a cube with side length s.

4 All Kinds of Equations (Optional)

Student Task Statement

Here are six different equations.

$$y = 4 + x \qquad\qquad y = 4x \qquad\qquad y = \frac{4}{x}$$

$$y = \frac{x}{4} \qquad\qquad y = 4^x \qquad\qquad y = x^4$$

$y = 4 + x$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

$y = 4x$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

$y = \frac{4}{x}$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

$y = \frac{x}{4}$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

$y = 4^x$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

$y = x^4$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

1. Predict which of these equations represent a proportional relationship.

2. Complete each table using the equation that represents the relationship.

3. Do these results change your answer to the first question? Explain your reasoning.

4. What do the equations of the proportional relationships have in common?