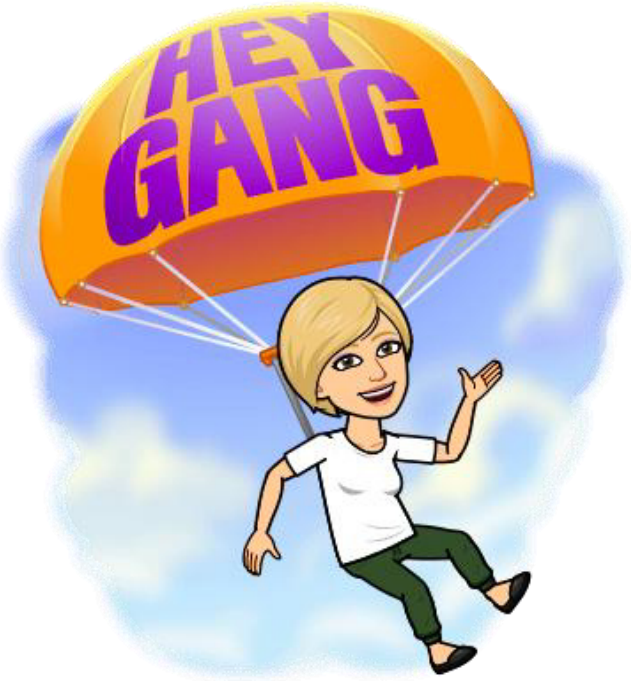
Today's Materials



- calculator
- pencil
- notebook
- glue
- highlighter

Comparing Relationships with Equations

Lesson 8

CCSS Standards: Building on	• 4.OA.C.5 • 6.EE.A.2
CCSS Standards: Addressing	• 7.G.B.6 • 7.RP.A.1 • 7.RP.A.2

Let's develop methods for deciding if a relationship is proportional.

Today's Goals

- ❑ I can decide if a relationship represented by an equation is proportional or not.

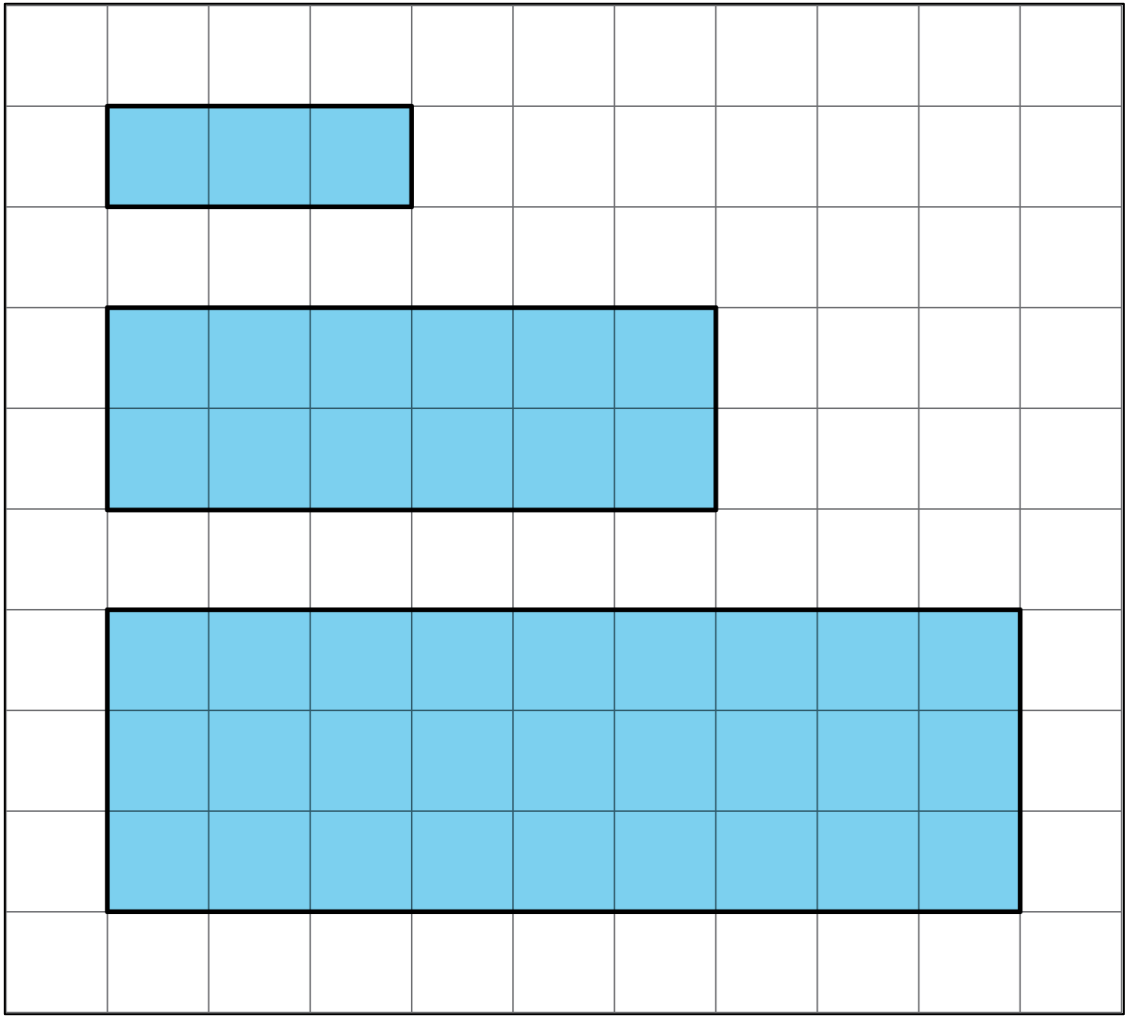
Notice and Wonder:
Patterns with Rectangles

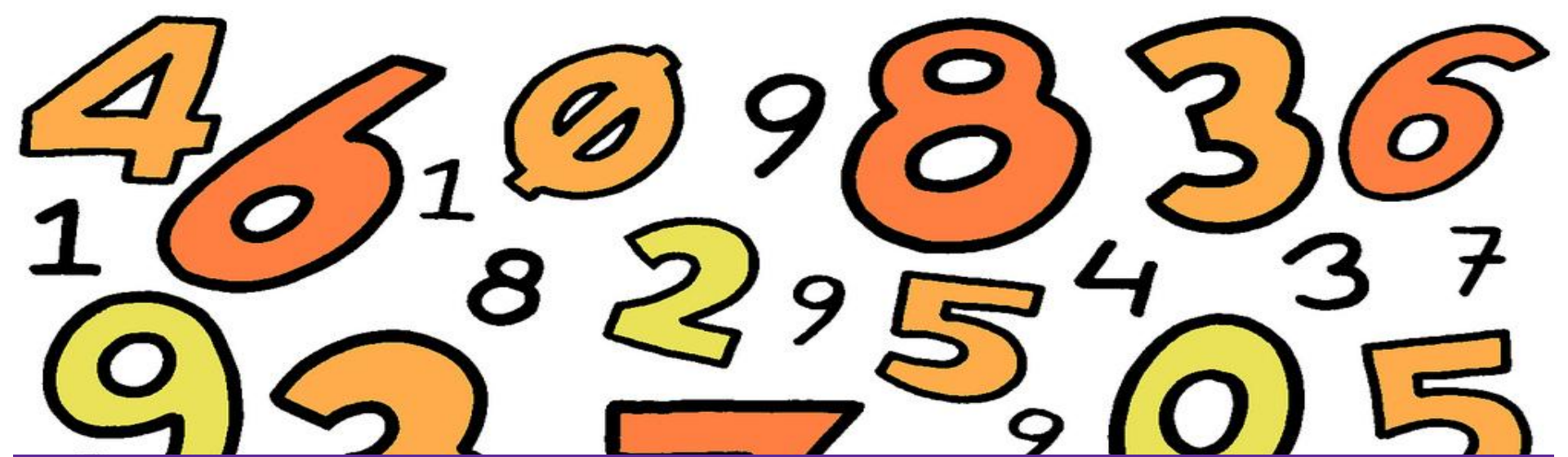
Warm Up

What do you notice?

What do you wonder?

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





Solving for *x*

Warm Up

$$10x + 15 = y$$

Solve for y if...

$x = 5$

$x = 7$

$x = \frac{1}{5}$

More Conversions

Activity 8.2

- Think Pair Share

We've talked about converting meters, centimeters, and millimeters.

In this Activity, you will be working with some more unit conversions.

➔ Begin with Quiet Work Time (5 minutes).
➔ Share your thinking with a partner.

$F = 9/5C + 32$

temperature (°C)	temperature (°F)
20	68
4	39.2
175	347

$c = 2.54n$

length (in)	length (cm)
10	25.4
8	20.32
$3\frac{1}{2}$	8.89

What do you notice about the forms of the equations for each relationship?

Which equation represents a proportional relationship?

- The proportional relationship is of the form $y = kx$, while the nonproportional relationship is not.

Proportional Relationships

$$y = kx$$

$$kx = y$$

Total Edge Length, Surface Area, and Volume

Activity 8.3

- Think Pair Share

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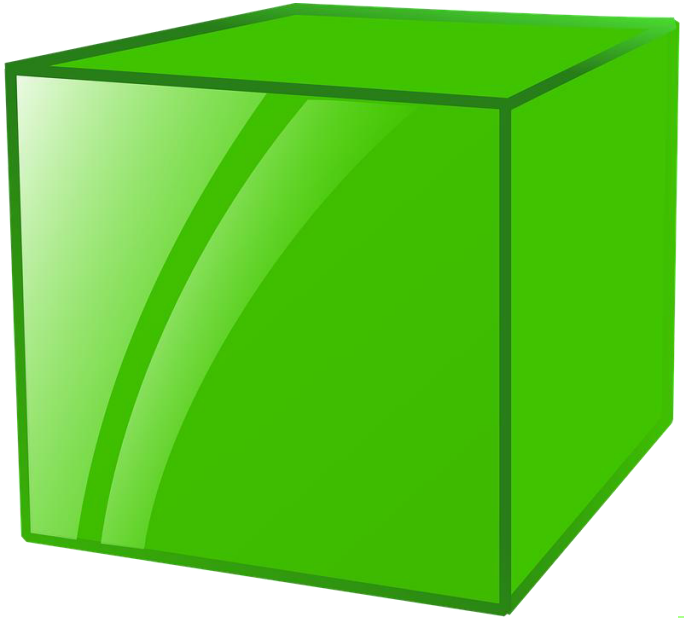

How many edges are there?

How long is one edge?

How many faces are there?

How large is one face?

Quietly work on this activity on your own. (5 min.)

Share your thinking as a team.

What do you notice about the equation for the relationship that is proportional?

How long is the total edge length of each cube?

side length	total edge length
3	36
5	60
9 ½	114
s	

What is the surface area of each cube?

side length	surface area
3	54
5	150
9 ½	541 ½
s	

What is the volume of each cube?

side length	volume
3	27
5	125
9 ½	857 ⅜
s	

➔ What could be possible units for the side lengths?
➔ Then what would be the units for the surface area?
➔ What would be the units for the volume?

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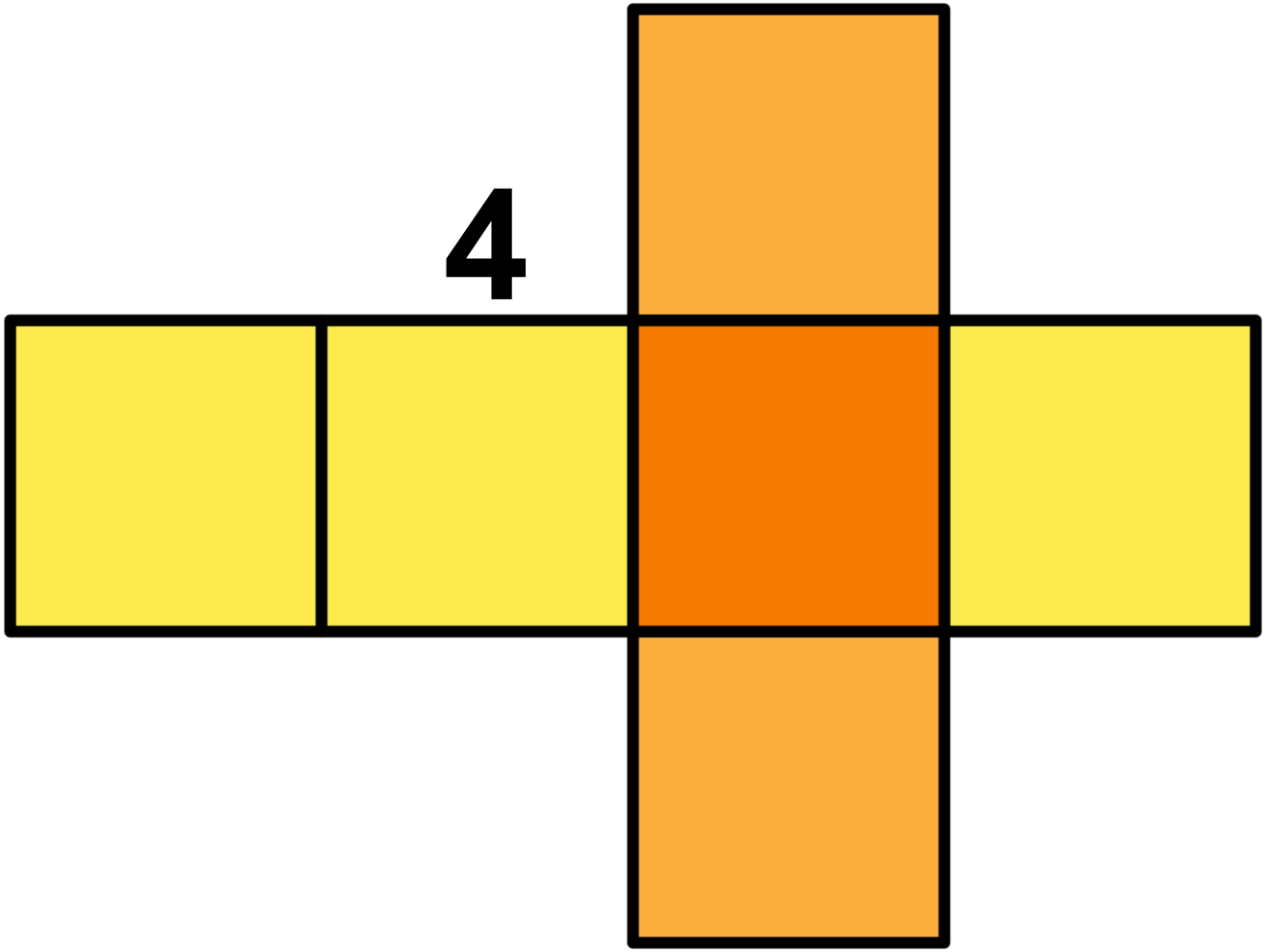
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“Are you ready for more?”

1. A rectangular solid has a square base with side length ℓ, height 8, and volume V. is the relationship between ℓ and V a proportional relationship?
2. A different rectangular solid has length ℓ, width 10, height 5, and volume V. Is the relationship between ℓ and V a proportional relationship?
3. Why is the relationship between the side length and the volume proportional in one situation and not the other?

All Kinds of Equations

(optional)

Activity 8.4

Think Pair Share

Begin this activity on your own. (5 min.)

Share your ideas as a team.

$$y = 4 + x$$

x	y	$\frac{y}{x}$
2	6	3
3	7	$2\frac{1}{3}$
4	8	2
5	9	$1\frac{4}{5}$

$$y = 4x$$

x	y	$\frac{y}{x}$
2	8	4
3	12	4
4	16	4
5	20	4

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

x	y	$\frac{y}{x}$
2	2	1
3	$\frac{4}{3}$	$\frac{4}{9}$
4	1	$\frac{1}{4}$
5	$\frac{4}{5}$	$\frac{4}{25}$

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

x	y	$\frac{y}{x}$
2	$\frac{1}{2}$	$\frac{1}{4}$
3	$\frac{3}{4}$	$\frac{1}{4}$
4	1	$\frac{1}{4}$
5	$\frac{5}{4}$	$\frac{1}{4}$

$$y = 4^x$$

x	y	$\frac{y}{x}$
2	16	8
3	64	$21\frac{1}{3}$
4	256	64
5	1,024	$204\frac{4}{5}$

$$y = x^4$$

x	y	$\frac{y}{x}$
2	16	8
3	81	27
4	256	64
5	625	125

Today we discovered that proportional relationships are written in equations in the form:

$$y = kx$$

Examples of equations of proportional relationships:

$y = 5.2x$

$W = 205n$

$d = 58t$

$y = \frac{1}{2}x$

$a = 0.12B$

Also Remember:
If a table represents a proportional relationship between x and y, then the unit rates y/x are always the same.

x	y	$\frac{y}{x}$
3	$3k$	k
5	$5k$	k
400	$400k$	k

Today's Goals

- ❑ I can decide if a relationship represented by an equation is proportional or not.

Tables and Chairs

Cool Down