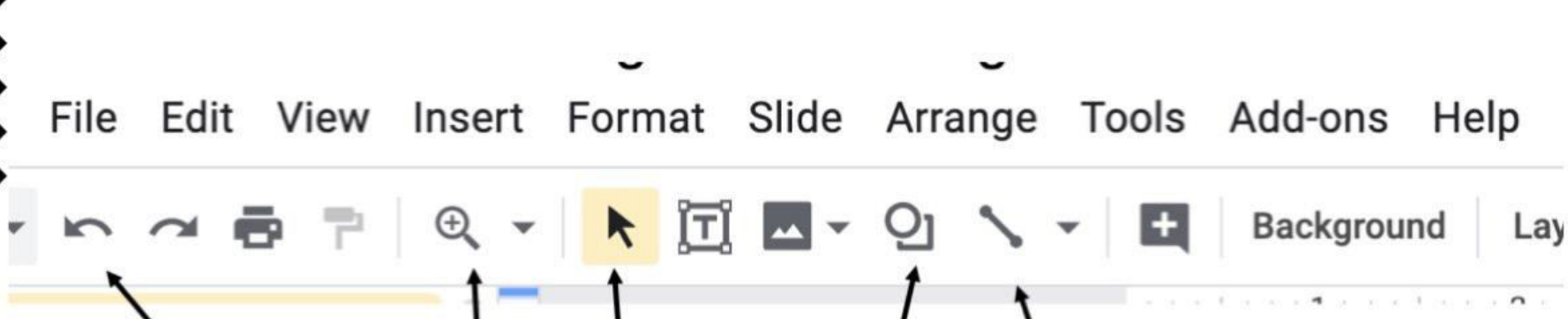
Unit 2: Introducing Proportional Relationships

Type here

Math – Ms. Yonash

Important Google Tools



Shortcuts

CTRL + C= COPY

CTRL + V= PASTE

CTRL + Z= UNDO

CTRL + X= CUT

How to Insert and Format a Table in Google

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

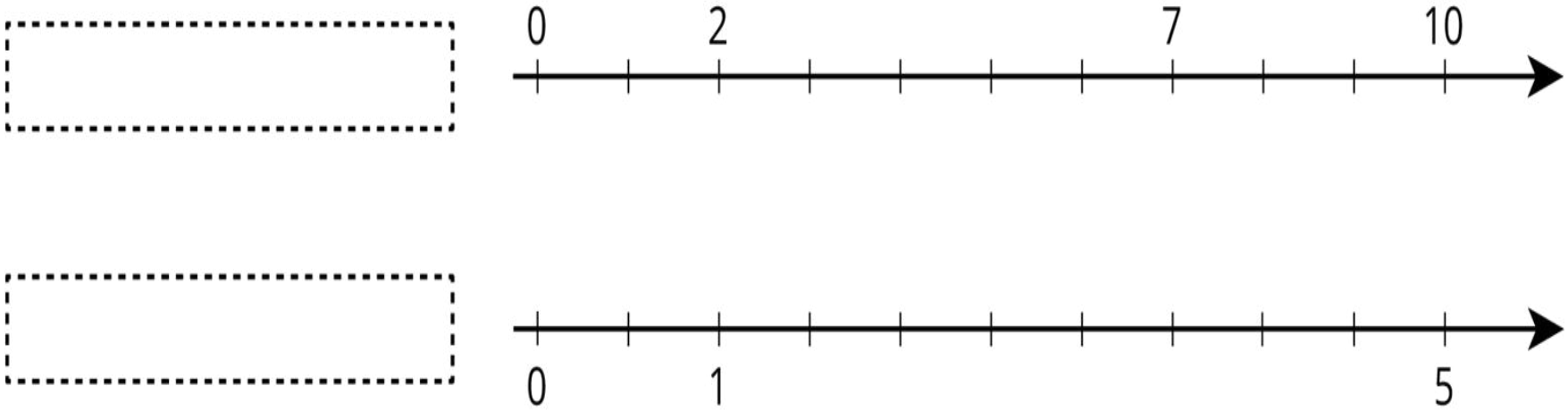
Lesson 1: One of These Things is Not Like the Others

Learning Goals	I can use equivalent ratios to describe scaled copies of shapes.
	I know that two recipes will taste the same if the ingredients are in equivalent ratios.

Lesson 1: One of These Things is Not Like the Others

Lesson 1: One of These Things is Not Like the Others – Activity 1

1. Complete the double number line diagram with the missing numbers using a text box or scribble tool.



1. What could each of the number lines represent? Invent a situation and label the diagram (dotted boxes). Make sure your labels include appropriate units of measure.

Lesson 1: One of These Things is Not Like the Others – Activity 2

1. Which mixture do you think tastes different? Explain your reasoning

   Type your answer here.

Lesson 1: One of These Things is Not Like the Others – Activity 2 Continued

2. Here are the completed drink mixes. Which one is the stronger mixture. Why is that?
   Type your answer here.

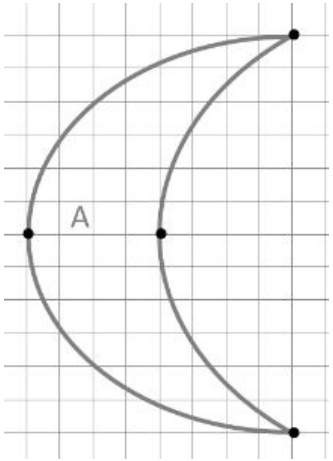
Lesson 1: One of These Things is Not Like the Others – Activity 3

Open the Crescent Moon Activity app. Then answer the questions

1. How is moon D different than the rest? Type your answer here.

1. Complete the table to show with numbers how moons A, B, and C are different than D

Moon	Width	Height	$\frac{\text{Height}}{\text{Width}}$
A			
B			
C			
D			



Lesson 1: Orangey-Pineapple -- Cool Down Assignment

Here are three different recipes for Orangey-Pineapple Juice. Two of these mixtures taste the same and one tastes different.

- Recipe 1: Mix 4 cups of orange juice with 6 cups of pineapple juice.
- Recipe 2: Mix 6 cups of orange juice with 9 cups of pineapple juice.
- Recipe 3: Mix 9 cups of orange juice with 12 cups of pineapple juice.

1. Which two recipes will taste the same, and which one will taste different? Explain or show your reasoning here.

Lesson 1: One of These Things is Not Like the Others – SUMMARY

Video Summary

Notes:

Homework/Practice:

Cool down on the previous page

Level 4:

Will any of these mixtures taste exactly the same?

- Mixture A: 2 cups water, 4 teaspoons salt, 0.25 cup sugar
- Mixture B: 1.5 cups water, 3 teaspoons salt, 0.2 cup sugar
- Mixture C: 1 cup water, 2 teaspoons salt, 0.125 cup sugar

Lesson 2: Introducing Proportional Relationships with Tables

Learning Goals	I can use a table to reason about two quantities that are in a proportional relationship.
	I understand the terms proportional relationship and constant of proportionality.

Lesson 2: Introducing Proportional Relationships with Tables – Activity 1

Here is a table that shows how many rolls of paper towels a store receives when they order different numbers of cases.

number of cases they order	number of rolls of paper towels
1	12
3	36
5	60
10	120

•2

•2

What do you notice or wonder about this table?
Type your thoughts here

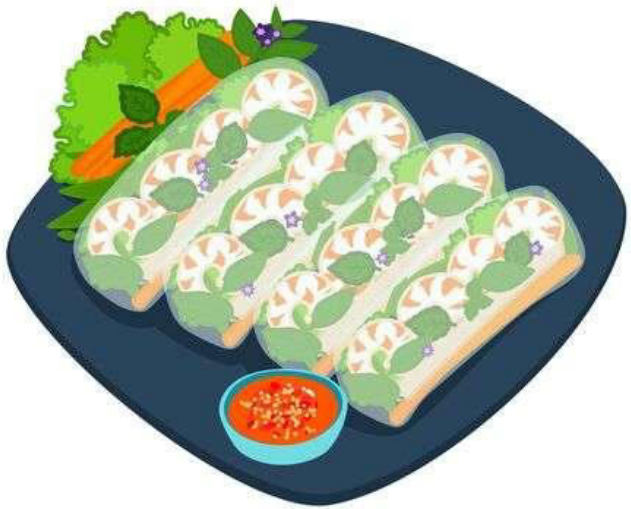
Lesson 2: Introducing Proportional Relationships with Tables -- Activity 2

. A recipe says that 2 cups of dry rice will serve 6 people. Complete the table as you answer the questions. Be prepared to explain your reasoning.

Cups of rice	Number of people
2	6
3	9
10	
	45
1	

Lesson 2: Introducing Proportional Relationships with Tables – Activity 2 Cont.

A recipe says that 6 spring rolls will serve 3 people. Complete the table below.

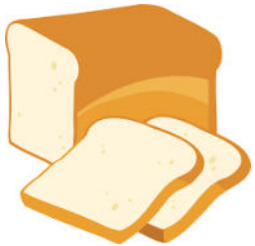


Number of spring rolls	Number of people
6	3
30	
40	
	28
1	

Lesson 2: Introducing Proportional Relationships with Tables– Activity 3

A bakery uses 8 tablespoons of honey for every 10 cups of flour to make bread dough. Some days they bake bigger batches and some days they bake smaller batches, but they always use the same ratio of honey to flour.

1. What is the constant of proportionality?
   Type your answer here



Honey (tbsp)	Flour (c)
8	10
20	
13	
	20
1	

Lesson 2: Introducing Proportional Relationships with Tables – Cool Down

When Han makes chocolate milk, he mixes 2 cups of milk with 3 tablespoons of chocolate syrup. Here is a table that shows how to make batches of different sizes.

cups of milk	tablespoons of chocolate syrup
2	3
8	12
1	$\frac{3}{2}$
10	15

• 4 (2 → 8)

• 4 (3 → 12)

Use the information in the table to complete the statements.

a. The table shows a proportional relationship between _____ and _____.
b. The scale factor shown is _____.
c. The constant of proportionality for this relationship is _____.
d. The units for the constant of proportionality are _____ per _____.

Lesson 2: Corresponding Parts & Scale Factors – SUMMARY

Video Summary

Notes:

Homework/Practice:

Cool down on the previous slide

Level 4:

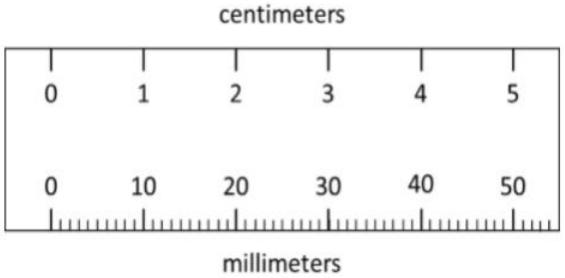
Pennies made before 1982 are 95% copper and weigh about 3.11 grams each. (Pennies made after that date are primarily made of zinc). Some people claim that the value of the copper in one of these pennies is greater than the face value of the penny. Find out how much copper is worth right now, and decide if this claim is true.

Lesson 3: More About the Constant of Proportionality

Learning Goals	I can find missing information in a proportional relationship using a table.
	I can find the constant of proportionality from information given in a table.

Lesson 3:More About the Constant of Proportionality

Lesson 3: Centimeters and Millimeters -- Activity 2

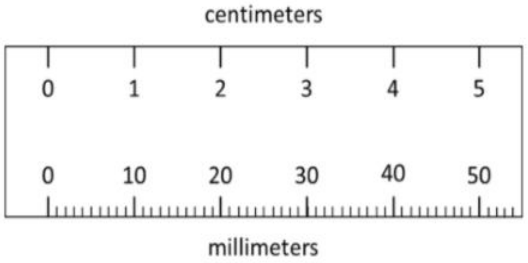


There are two ways of thinking about this proportional relationship.

1. If you know the length of something in centimeters, you can calculate its length in millimeters.
   a. Complete the table.
   b. What is the constant of proportionality?
      Type your answer here

Length (cm)	Length (mm)
9	
12.5	
50	
1	

Lesson 3: Centimeters and Millimeters -- Activity 2 Continued



2. If you know the length of something in millimeters, you can calculate its length in centimeters.

a. Complete the table.
b. What is the constant of proportionality? Type your answer here

Length (mm)	Length (cm)
70	
245	
4	
1	

Lesson 3: Pittsburgh to Phoenix -- Activity 3

"Map of the path of a plane flying from New York to San Diego" by United States Census Bureau via American Fact Finder.
Public Domain.

Lesson 3: Pittsburgh to Phoenix -- Activity 3 Continued

A plane traveling at a constant speed flew over Pittsburgh, Saint Louis, Albuquerque, and Phoenix on its way from New York to San Diego.

Complete the table and answer the question

Segment	Time	Distance	Speed (Constant)
Pittsburgh to St Louis	1 hour	550 miles	
St Louis to Albuquerque	1 hour and 42 min		
Albuquerque to Phoenix		330 miles	

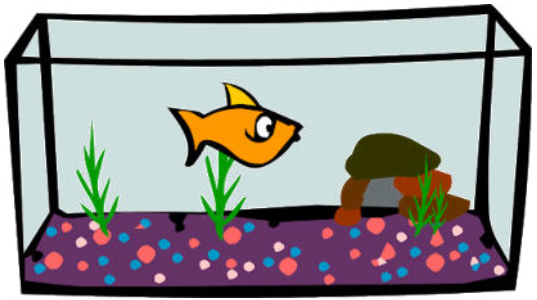
1. Diego says the constant of proportionality is 550. Andre says the constant of proportionality is 9 ⅙ . Do you agree with either of them? Explain your reasoning here

Lesson 3: Fish Tank-- Cool Down Assignment

Mai is filling her fish tank. Water flows into the tank at a constant rate. Complete the table as you answer the questions.

1. What is the constant of proportionality? Type your answer here

Time (minutes)	Water (gallons)
0.5	0.8
1	
3	
	40



Lesson 3: – SUMMARY

Video Summary

Notes:

Homework/Practice:

Cool down on previous slide

Kahoot!

Level 4:

1. How many square millimeters are there in a square centimeter?

1. How do you convert square centimeters to square millimeters? How do you convert the other way?

Lesson 4: Proportional Relationships and Equations

Learning Goals	
	I can write the the constant of proportionality as an entry in a table
	I can write an equation of the form y=kx to represent a proportional relationship described by a table or a story.

Lesson 4: Proportional Relationships and Equations

Lesson 4: Feeding a crowd revisited- Activity 2, part 1

A recipe says that 2 cups of dry rice will serve 6 people.

Cups of dry rice	Number of people
1	
2	6
3	
12	
43	
x	

The expression to solve for the number of people feed for any amount of rice is _____

Lesson 4: Feeding a crowd revisited- Activity 2, part 2

A recipe says that 6 spring rolls will serve 3 people

Cups of dry rice	Number of people
1	
6	3
10	
16	
25	
n	

The expression to solve for the number of people feed for any amount of spring rolls is _____

Lesson 4: Denver to Chicago -- Activity 3

A plane flew at a constant speed between Denver and Chicago. It took the plane 1.5 hours to fly 915 miles.

"Map of the midwest from Denver to Chicago" by United States Census Bureau via American Fact Finder. Public Domain.

Time (hours)	Distance (miles)	Speed (miles per hour)
1		
1.5	915	
2		
2.5		
h		

The expression to solve for total distance for any number of hours is _____

Lesson 4: It's snowing in Syracuse! -- Cool Down Assignment

Snow is falling steadily in Syracuse, New York. After 2 hours, 4 inches of snow has fallen. Complete the table.

Time (hours)	Snow (inches)
	1
1	
2	4
6.5	
x	

The expression to solve for total inches of snow for any number of hours is _____

Lesson 4: - SUMMARY

Video Summary

Homework/Practice:

Cool down on previous slide

Notes:

Level 4:
A rocky planet orbits Proxima Centauri, a star that is about 1.3 parsecs from Earth. This planet is the closest planet outside of our solar system.

1. How long does it take light from Proxima Centauri to reach the Earth? (A parsec is about 3.26 light years. A light year is the distance light travels in one year.)

1. There are two twins. One twin wants to explore the planet near Proxima Centauri and leaves on a spaceship traveling at 90% of the speed of light, while the other twin stays home on Earth. How much does the twin on Earth age while the other twin travels to Proxima Centauri? (Do you think the answer would be the same for the other twin? Consider researching "The Twin Paradox" to learn more.)

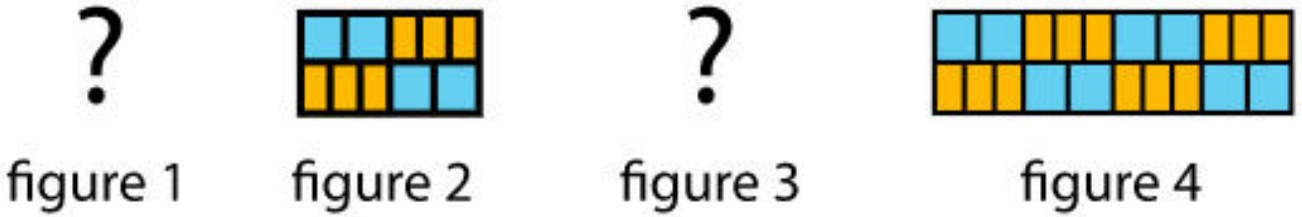
Lesson 5: Two Equations For Each Relationship

Learning Goals	I can find two constants of proportionality for a proportional relationship.
	I can write two equations representing a proportional relationship described by a table or story.

Lesson 5: Two Equations For Each Relationship

Lesson 5: Pattern Warm Up

Here are the second and fourth figures in a pattern.



1. What do you think the first and third figures in the pattern look like? Type your answer here

1. Describe the 10th figure in the pattern. Type your answer here

Lesson 5: Meters and Centimeters -- Activity 2

There are 100 centimeters (cm) in every meter (m).

Length (m)	Length (cm)
1	100
0.94	
1.67	
57.24	
x	
Equation:	

Length (cm)	Length (m)
100	1
250	
78.2	
123.9	
x	
Equation:	

For each table:

1. Complete the table
2. Find the constant of proportionality
3. What is the relationship between these constants?

Lesson 5: Filling a Water Cooler -- Activity 3

It took Priya 5 minutes to fill a cooler with 8 gallons of water from a faucet that was flowing at a steady rate. Let w be the number of gallons of water in the cooler after t minutes.

1. Highlight which one of these equations represents the relationship between w and t? Select **all** that apply. Consider making a table on paper to help you.

a. w = 1.6t
b. w = 0.625t
c. t = 1.6w
d. t = 0.625w

2. What does 1.6 tell you about the situation? Type your answer here

3. What does 0.625 tell you about the situation? Type your answer here

Lesson 5: Filling a Water Cooler -- Activity 3, part 2

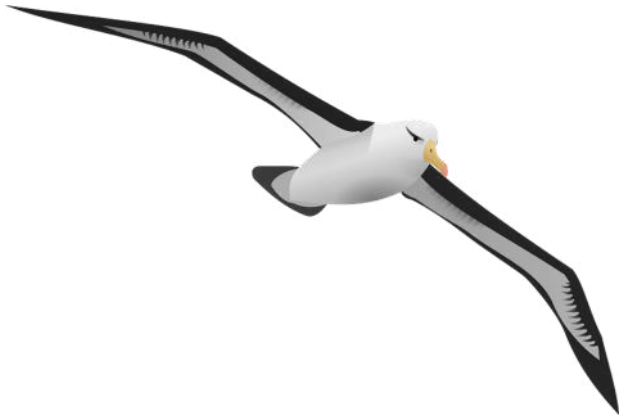
Priya changed the rate at which water flowed through the faucet.

1. **Write an equation** that represents the relationship of w and t when it takes 3 minutes to fill the cooler with 1 gallon of water.

1. Was the cooler filling faster before or after Priya changed the rate of water flow? Explain how you know here

Lesson 5: Flight of the Albatross -- Cool Down Assignment

An albatross is a large bird that can fly 400 kilometers in 8 hours at a constant speed. Using *d* for distance and *t* for number of hours, an equation that represents this situation is d = 50t



1. What are the two constants of proportionality for this relationship? Type your answer here

1. Write another equation (using the second constant of proportionality) that relates *d* and *t.* Type your answer here

Lesson 5: The Size of the Scale Factor – SUMMARY

Video Summary

Notes:

Homework/Practice:

Cool down on previous page

Level 4:

1. How many cubic centimeters are there in a cubic meter?

1. How do you convert cubic centimeters to cubic meters?

1. How do you convert the other way?

Lesson 6: Using Equations to Solve Problems

Optional

Learning Goals	
	I can relate all parts of an equation like y=kx to the situation it represents.
	I can find missing information in a proportional relationship using the constant of proportionality.

Lesson 6: Using Equations to Solve Problems

Lesson 6: Optional Concert Ticket Sales -- Activity 2

A performer expects to sell 5,000 tickets for an upcoming concert. They want to make a total of $311,000 in sales from these tickets.

1. Assuming that all tickets have the same price, what is the price for one ticket? Answer here

1. How much will they make if they sell 7,000 tickets? Answer here

1. How much will they make if they sell 10,000 tickets? 50,000? 120,000? a million? x tickets? Answer here

1. If they make $379,420, how many tickets have they sold? Answer here

1. How many tickets will they have to sell to make $5,000,000? Answer here

Consider making a table to help you answer these questions

Lesson 6: Recycling– Optional Activity 3

Aluminum cans can be recycled instead of being thrown in the garbage. The weight of 10 aluminum cans is 0.16 kilograms. The aluminum in 10 cans that are recycled has a value of $0.14.

1. If a family threw away 2.4 kg of aluminum in a month, how many cans did they throw away? Answer here

1. What would be the recycled value of those same cans? Answer here

1. Write an equation to represent the number of cans c given their weight w. Answer here

1. Write an equation to represent the recycled value r of c cans. Answer here

1. Write an equation to represent the recycled value r of w kilograms of aluminum. Answer here

Consider making a table to help you answer these questions

Lesson 6: Granola -- Optional Cool Down Assignment

Based on her recipe, Elena knows that 5 servings of granola have 1,750 calories.

1. If she eats 2 servings of granola, how many calories does she eat? Answer here

1. If she wants to eat 175 calories of granola, how many servings should she eat? Answer here

1. Write an equation to represent the relationship between the number of calories and the number of servings of granola. Answer here

Consider making a table to help you answer these questions

Lesson 6: – SUMMARY

Video Summary

Homework/Practice:

Cool down on previous slide

Notes:

Level 4:

The EPA estimated that in 2013, the average amount of garbage produced in the United States was 4.4 pounds per person per day. At that rate, how long would it take **your** family to produce a ton of garbage? (A ton is 2,000 pounds.)

Lesson 7: Comparing Relationships with Tables

Learning Goals	I can decide if a relationship represented by a table could be proportional and when it is definitely not proportional.

Lesson 7: Visiting the State Park– Activity 2

Entrance to a state park costs $6 per vehicle, plus $2 per person in the vehicle.

1. How much would it cost for a car with 2 people to enter the park? 4 people? 10 people? **Record your answers in the table.**

Number of people in vehicle	Total entrance cost in dollars	If every person split the total cost
2		
4		
10		

1. How might you determine the entrance cost for a bus with 50 people? Answer here

1. Is the relationship between the number of people and the total entrance cost a proportional relationship? Answer here

Lesson 7: Running Laps– Activity 3

Han and Clare were running laps around the track. The coach recorded their times at the end of laps 2, 4, 6, and 8.

Han's Run		
Distance (laps)	Time (minutes)	Minutes per lap
2	4	
4	9	
6	15	
8	23	

Clare's Run		
Distance (laps)	Time (minutes)	Minutes per lap
2	5	
4	10	
6	15	
8	20	

1. Is Han running at a constant pace? Is Clare? How do you know? Answer here
2. Write an equation for the relationship between distance and time for anyone who is running at a constant pace. Answer here

Lesson 7: – SUMMARY

Video Summary

Notes:

Homework/Practice:

None

Level 4:

Write an equation to figure out of to find the total entrance cost for any number of people to get into the state park from activity 2 (slide 47)

Lesson 8: Comparing Relationships with Equations

Learning Goals	I can decide if a relationship represented by an equation is proportional or not.

Lesson 8: Comparing Relationships with Equations

Lesson 8: More Conversions– Activity 2, part 1

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

Temperature (C)	Temperature (F)
20	
4	
175	

Is this a proportional relationship? Answer here

Lesson 8: More Conversions– Activity 2, part 1

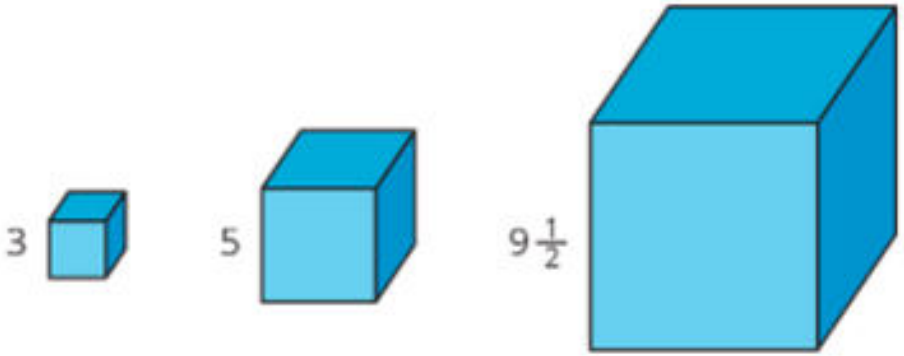
Use the equation $c = 2.54n$, where c represents centimeters and n represents length in inches, to complete the table.

Length (in)	Length (cm)
10	
8	
3 ½	

Is this a proportional relationship? Answer here

Lesson 8: Total Edge Length– Activity 3, part 1

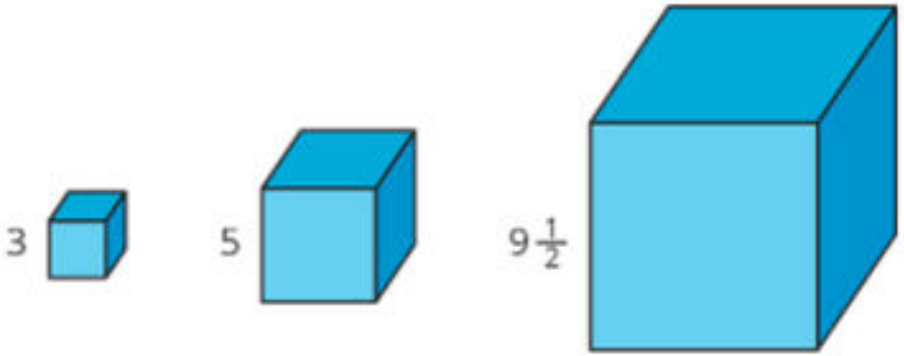
Side length	Total edge length
3	
5	
9 ½	
s	



Is this a proportional relationship? Answer here

Lesson 8: Total Surface Area– Activity 3, part 2

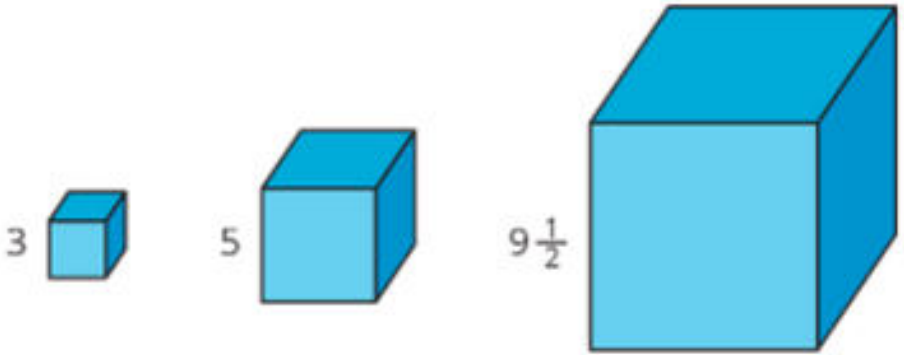
Side length	Surface Area
3	
5	
9 ½	
s	



Is this a proportional relationship? Answer here

Lesson 8: Total Volume– Activity 3, part 3

Side length	Volume
3	
5	
9 ½	
s	



Is this a proportional relationship? Answer here

Lesson 8: – SUMMARY

Video Summary

Homework/Practice:

None

Notes:

Level 4:

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?

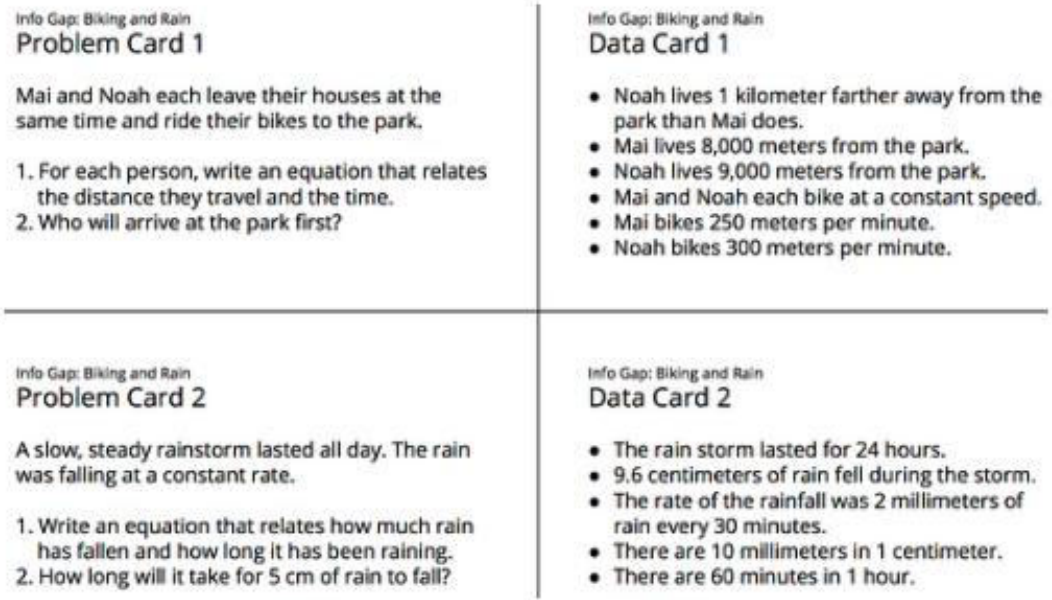
1. Why is the relationship between the side length and the volume proportional in one situation and not the other?

Lesson 9: Solving Problems About Proportional Relationships

Learning Goals	I can ask questions about a situation to determine whether two quantities are in a proportional relationship.
	I can solve all kinds of problem involving proportional relationships.

Lesson 9: – Activity 1

Click on the link to access the Desmos Infogap activity



Info Gap: Biking and Rain
Problem Card 1

Mai and Noah each leave their houses at the same time and ride their bikes to the park.

1. For each person, write an equation that relates the distance they travel and the time.
2. Who will arrive at the park first?

Info Gap: Biking and Rain
Data Card 1

- Noah lives 1 kilometer farther away from the park than Mai does.
- Mai lives 8,000 meters from the park.
- Noah lives 9,000 meters from the park.
- Mai and Noah each bike at a constant speed.
- Mai bikes 250 meters per minute.
- Noah bikes 300 meters per minute.

Info Gap: Biking and Rain
Problem Card 2

A slow, steady rainstorm lasted all day. The rain was falling at a constant rate.

1. Write an equation that relates how much rain has fallen and how long it has been raining.
2. How long will it take for 5 cm of rain to fall?

Info Gap: Biking and Rain
Data Card 2

- The rain storm lasted for 24 hours.
- 9.6 centimeters of rain fell during the storm.
- The rate of the rainfall was 2 millimeters of rain every 30 minutes.
- There are 10 millimeters in 1 centimeter.
- There are 60 minutes in 1 hour.

Lesson 9: – SUMMARY

Notes:

Homework/Practice:

Finish Infogap

Lesson 1-8 Paper Packet Practice Problems

Learning Goals	I can show my knowledge of all concepts learned from lesson 1 to lesson 8

Lesson 1-8 Paper Packet Practice Problems

Lesson 10: Introducing Graphs of Proportional Relationships

Learning Goals	I know that the graph of a proportional relationship lies on a line through (0,0).

Lesson 10: Notice These Points– Activity 1

Plot the following points in the applet.

(0, 10), (1, 8), (2, 6), (3, 4), (4, 2)

What do you notice about the graph? Answer here

Lesson 10: T-Shirts for Sale- Activity 2

Some t-shirts cost $8 each.

Use the table to answer these questions

1. What does x represent? Answer here
2. What does y represent? Answer here

1. Is there a proportional relationship between x and y? Answer here

1. Plot the points on the graph in this applet. What do you notice about the graph? Answer here.

x	y
1	8
2	16
3	24
4	32
5	40
6	48

Click on the link to access the Desmos Graph Match activity

Lesson 10: – SUMMARY

Video Summary

Notes:

Homework/Practice:

Complete Desmos Activity on previous slide

Level 4:

1. All the graphs in this activity show points where both coordinates are positive. Would it make sense for any of them to have one or more coordinates that are negative?

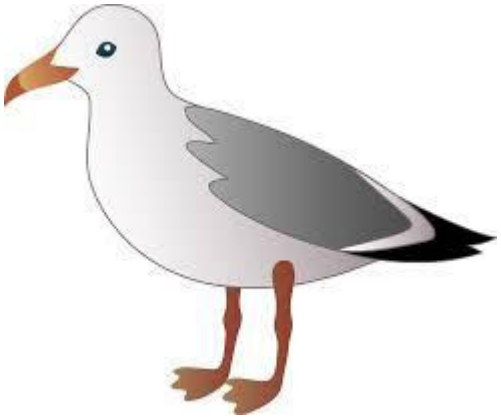
1. The equation of a proportional relationship is in the form y=kx , where k is a positive number, and the graph is a line through (0,0) . What would the graph look like if k were a negative number?

Lesson 11: Interpreting Graphs Of Proportional Relationships

Learning Goals	
	I understand the information given by graphs of proportional relationships that are made of up of points or a line.
	I can find the constant of proportionality from a graph.
	I can draw the graph of a proportional relationship given a single point on the graph (other than the origin).

Lesson 11: Tyler's Walk and Seagulls Eat What?-- Activity 1, 2, and 3

This lesson is all through Desmos. Please click on the link to access all three activities. It will automatically save your progress.



Lesson 11: – SUMMARY

Video Summary

Homework/Practice:

Complete the Desmos activity linked on the previous slide

Notes:

Level 4:

If Tyler wanted to get to the bumper cars in half the time, how would the graph representing his walk change? How would the table change? What about the constant of proportionality?

Lesson 12: Using Graphs to Compare Relationships

Learning Goals	
	I know that the steeper graph of two proportional relationships has a larger constant of proportionality.
	I can compare two, related proportional relationships based on their graphs.

Lesson 12: Using Graphs to Compare Relationships

Lesson 12: Race to the Bumper Cars– Activity 2

Please use the link to access the Desmos activity "Race to the Bumper Cars"

Lesson 12: – SUMMARY

Video Summary

Homework/Practice:

Complete Desmos activity linked on the previous slide. The last slide is the cool down activity

Notes:

Level 4:

Write equations to represent each person's relationship between time and distance.

Lesson 13: Two Graphs for Each Relationship

Learning Goals	
	I know that the steeper graph of two proportional relationships has a larger constant of proportionality.
	I can compare two, related proportional relationships based on their graphs.

Lesson 13: Two Graphs for Each Relationship

Lesson 13: Tables, Graphs, Equations and Hotdog Eating Contest– Activity 2 and 3

Last time! Click on the link to take you to the Desmos activity for the graphing points and Hotdog Eating Contest problems.

Lesson 13: – SUMMARY

Homework/Practice:

Finish the Desmos activity linked on the previous slide

Notes:

Level 4:

The graph of an equation in the form y=kx , where k is a positive number, is a line through (0,0) and the point (1, k) .

1. Name at least one line through (0,0) that cannot be represented by an equation like this.

1. If you could draw the graphs of *all* of the equations of this form in the same coordinate plane, what would it look like?

Unit 2: Proportions Resources

- How to find area of polygons (6th grade skill)
- Making Equivalent Fractions (6th grade skill)
- Equivalent Ratios (6th grade skill)

- Proportions with Tables: Lesson 2-3 Video Summary
- Proportions with equations Lesson 4-6 Video Summary
- Proportional vs Non-Proportional: Lesson 7-8 Video Summary
- Proportions with graphs: Lesson 10-13 Video Summary

Khan Academy Practice Test

Review Paper Packet