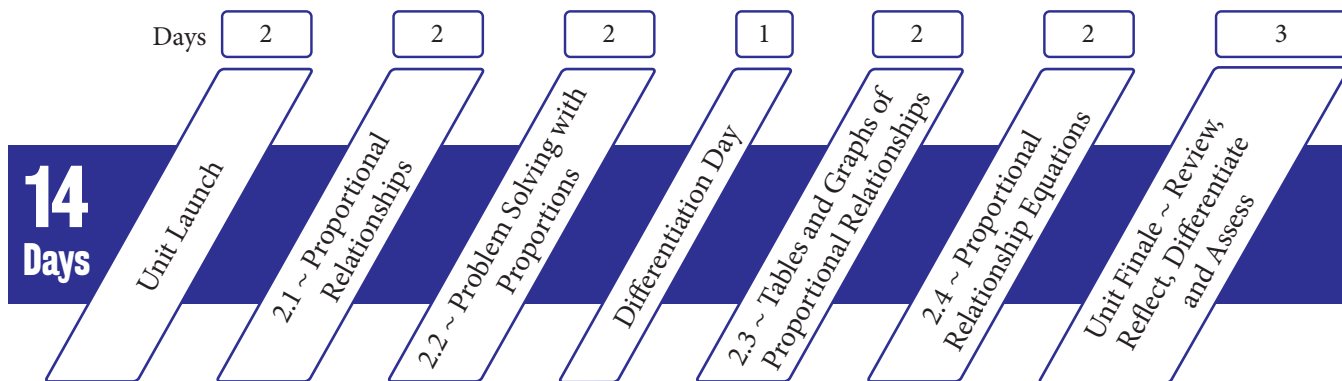


Unit Pacing



Standards Correlation

Focus Content Standards

The Focus Content Standards for this unit provide continued attention to the major cluster addressed in Unit 1 *Ratios and Rates*. Standard 7.RP.A.3 will be revisited again as a Focus Standard in Unit 3 *Percents*, and both standards will reappear as Connecting Standards throughout the rest of the course. The standards in this unit are formatively assessed throughout the unit and summatively assessed in the unit's Test Prep, Performance Assessment and Unit Assessments.

		Lesson	2.1	2.2	2.3	2.4
7.RP.A.2 MAJOR	Recognize and represent proportional relationships between quantities. a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. c. Represent proportional relationships by equations. d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.		✓ 2a		✓ 2a,b,d	✓ 2a-d
7.RP.A.3 MAJOR	Use proportional relationships to solve multistep ratio and percent problems.			✓		

Connecting Content Standards

7.RP.A.1, 7.NS.A.1, 7.NS.A.2, 7.NS.A.3, 7.EE.A.2, 7.EE.B.4, 7.G.A.1, 7.G.B.6

In this unit, students apply their previous work with ratios and rates (7.RP.A.1) as they explore proportional relationships. Problem solving with proportions offers students exposure to rational number operations (7.NS.A.1-3) and gives them opportunities to construct expressions and equations (7.EE.A.2, 7.EE.B.4) and solve one-step equations. Students will also use proportional reasoning to find missing side lengths in scale drawings (7.G.A.1) and solve problems involving areas of polygons (7.G.B.6).

Focus Mathematical Practice Standards

The Standards for Mathematical Practice (SMPs) are integrated throughout EdGems Math. Each lesson specifically provides implementation guidance for the SMPs in the Teacher Guide. Students also have the opportunity to identify moments in which they apply the SMPs throughout the unit using the Mathematical Practices Tracker. The SMPs can be formatively assessed during the unit Storyboards (SMP8) and Performance Task (SMP1) and summatively assessed during the Performance Assessment (SMP4).

Lesson	2.1	2.2	2.3	2.4
Focus Math Practice	SMP3	SMP2	SMP3	SMP8

Content Analysis

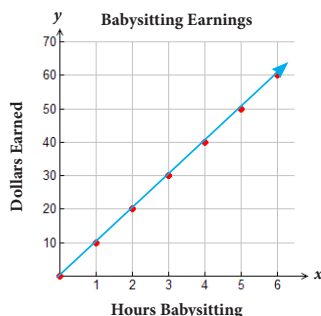
In this unit, students will build upon their experiences with ratios and rates to delve into explorations of proportionality. Previously in Course 1 and the first unit of this course, students explored the multiplicative relationships in equivalent ratios or rates using tape diagrams, graphs, tables and double number lines. In this unit, students will learn that equivalent ratios form a proportional relationship and that proportionality can also be identified in tables, graphs and equations by looking for specific structures unique to proportional relationships. For example, graphs of proportional relationships form a straight line that passes through the origin. This structure can be observed in a table of values that includes the point (0,0) where each ordered pair has a constant ratio of y to x . This constant ratio, known as the constant of proportionality, is also known as a unit rate, and can be identified as the slope on a graph in a proportional relationship and as the coefficient of x in a proportional relationship equation.

Tables

Hours Babysitting, x	Dollars Earned, y	Unit Rate, $\frac{y}{x}$
0	0	Can't divide by 0
1	10	$\frac{10}{1}$
2	20	$\frac{20}{2} = \frac{10}{1}$
3	30	$\frac{30}{3} = \frac{10}{1}$
4	40	$\frac{40}{4} = \frac{10}{1}$
5	50	$\frac{50}{5} = \frac{10}{1}$
6	60	$\frac{60}{6} = \frac{10}{1}$

If the ratio is the same, the table shows a proportional relationship.

Graphs



Equations

Proportional Relationship Equation

$$y = rx$$

where r is the constant of proportionality or unit rate $\frac{y}{x}$.

Before working specifically with tables and graphs, the unit begins by making connections between equivalent ratios and equations. Students consider how solving a proportion connects to the equation-solving process previously learned in Grade 6, helping them to understand the rationale for the cross-multiplication method of solving proportions. The unit then shifts focus to recognizing various representations of proportional relationships, with particular emphasis on identifying and explaining the meaning of the constant of proportionality. In future courses, students will distinguish between linear equations that are proportional or non-proportional, thus beginning their introduction to linear, and eventually non-linear, functions.

$$\begin{aligned} 10 \bullet \frac{x}{10} &= \frac{3}{4} \bullet 10 \\ x &= \frac{3}{4} \bullet 10 \\ 4 \bullet x &= \frac{3 \bullet 10}{4} \\ 4 \bullet x &= 3 \bullet 10 \end{aligned}$$

Readiness Check & Learning Progression

Readiness Check Skills

Skill 1: I can solve one-step equations. **6.EE.B.7**

Skill 2: I can create a table of values for an equation in the form $y = rx$. **6.EE.C.9**

Skill 3: I can graph points in all four quadrants. **5.G.A.1**

Previously, students have...

Used rate language in the context of a ratio relationship and understood a unit rate.

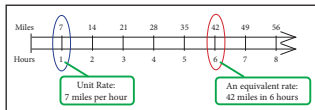
6.RP.A.2

$$\frac{50 \text{ miles}}{2 \text{ hours}} = \frac{25 \text{ miles}}{1 \text{ hour}}$$

(Arrows indicate dividing both numerator and denominator by 2)

Use ratio and rate reasoning to solve real-world problems.

6.RP.A.3



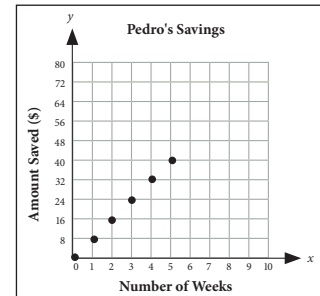
Wrote equations by expressing one variable in terms of the other quantity and solved equations.

6.EE.B.7, 6.EE.C.9

Days, x	Pounds, y
0	0
1	0.5
2	1
3	1.5
4	2

Created tables and graphs from equations.

6.EE.C.9



In this unit, students will...

Determine whether two quantities are proportional and identify the constant of proportionality.

7.RP.A.2a, 7.RP.A.2b

$$\frac{3}{9} = \frac{1}{3} \quad \frac{10}{30} = \frac{1}{3}$$

The constant of proportionality for these two ratios is $\frac{1}{3}$.

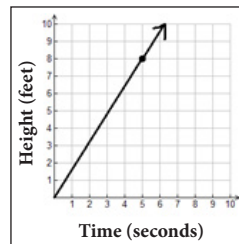
Represent a proportional relationship with an equation.

7.RP.A.2c

Choose any (x, y) point on the line and find the ratio of $\frac{y}{x}$. $(5, 8) \rightarrow \frac{8}{5} = 1.6$
Write an equation in the form $y = rx$. $y = 1.6x$

Explain what a point on the graph of a proportional relationship means.

7.RP.A.2d



Use proportional relationships to solve multistep problems.

7.RP.A.3

Juanita opened her own movie theater. She plans to charge \$5.00 per person and hopes to fill her 50-seat theater once in the late afternoon and once in the evening.

a. Copy and complete this table to show how much money Juanita will get for selling the given numbers of tickets to a show.

Number of tickets sold, x	0	10	15	20	40	50
Money collected (\$), y						

b. Is this a proportional relationship? Explain your reasoning.
c. Write an equation for the amount of money collected (y) based on the number of tickets sold (x).
d. If Juanita sells out both shows in the afternoon and evening, how much money will she collect?

In the future, students will...

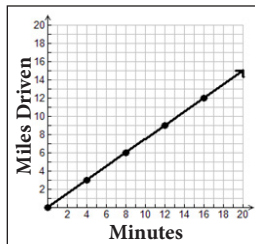
Apply and extend previous understandings of multiplication and division to multiply and divide rational numbers.

7.NS.A.2

$$\frac{3}{5} \div \frac{-7}{10} = \frac{3}{5} \cdot \frac{10}{-7} = \frac{30}{-35}$$

Understand the connections between proportional relationships, lines and linear equations.

8.EE.B.5-6

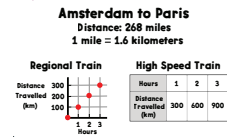


Use functions to model linear relationships between quantities.

8.F.B.4-5

x	y
-3	4.25
-1	1.75
2	-2
4	-4.5
10	-12

Storyboards



In this series of Storyboards, students will use proportions to convert between units of measurement. Students will look for and express regularity in repeated reasoning (**SMP8**) as they explore changing quantities when recognizing and representing proportional relationships (**7.RP.A.2**) in order to understand and explain differences in units of measurements.

Storyboard	Learning Outcome
Storyboard Launch	Brainstorm concepts about measurements
Lesson 2.1 Storyboard	Convert measurements between systems
Lesson 2.2 Storyboard	Solve a proportion
Lesson 2.3 Storyboard	Solve a proportion
Lesson 2.4 Storyboard	Determine if a relationship is proportional
Storyboard Finale	Compare proportional relationships between tables and graphs

Performance Task



In “Currency Exchange,” students will apply proportional reasoning to convert currencies from different countries. Students will persevere in problem solving (**SMP1**) and explore changing quantities as they represent proportional relationships (**7.RP.A.2-3**) to predict possible prices of commonly purchased goods.

Performance Assessment



In this Performance Assessment, students will use proportional reasoning to determine the sale prices at a video game store. Students will model with mathematics (**SMP4**) and explore changing quantities as they represent proportional relationships (**7.RP.A.2-3**) to understand the impact of sales and taxes on the final price of an item.

Fluency Boards

Target Skill	Standard(s)
Unit 2 Target Skill 1: Solve one-step equations	6.EE.B.7
Unit 2 Target Skill 2: Add and subtract decimals	5.NBT.B.7, 6.NS.B.3