

# EdGems Math ~ Course 2

## Content Standards Alignment

### Cluster Overview

Key: ■ Major Clusters; ■ Supporting Clusters; ■ Additional Clusters

#### Ratios and Proportional Reasoning

- 7.RP.A Analyze proportional relationships and use them to solve real-world and mathematical problems.

#### The Number System

- 7.NS.A Apply and extend previous understandings of operations with fractions to add, subtract, multiply and divide rational numbers.

#### Expressions and Equations

- 7.EE.A Use properties of operations to generate equivalent expressions.
- 7.EE.B Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

#### Geometry

- 7.G.A Draw, construct and describe geometrical figures and describe the relationship between them.
- 7.G.B Solve real-life and mathematical problems involving angle measure, area, surface area and volume.

#### Statistics and Probability

- 7.SP.A Use random sampling to draw inferences about a population
- 7.SP.B Draw informal comparative inferences about two populations.
- 7.SP.C Investigate chance processes and develop, use and evaluate probability models.

### 7. RP ~ Ratios and Proportional Relationships

#### 7.RP.A Analyze proportional relationships and use them to solve real-world and mathematical problems.

- |                          |   |
|--------------------------|---|
| Lessons<br>1.1, 1.2, 1.3 | 7.RP.A.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. <i>For example, if a person walks <math>\frac{1}{2}</math> mile in each <math>\frac{1}{4}</math> hour, compute the unit rate as the complex fraction miles per hour, equivalently 2 miles per hour.</i> |
| Lessons<br>2.1, 2.3, 2.4 | 7.RP.A.2 Recognize and represent proportional relationships between quantities.   |
| Lesson<br>2.3, 2.4       | 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.   |
| Lesson<br>2.4            | 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. <i>For example, if total cost, <math>t</math>, is proportional to the number, <math>n</math>, of items purchased at a constant price, <math>p</math>, the relationship between the total cost and the number of items can be expressed as <math>t = pn</math>.</i>  |

Lesson  
2.3, 2.4

Lessons  
2.2, 3.2, 3.3,  
3.4, 10.2

- 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.
- 7.RP.A.3 Use proportional relationships to solve multi-step ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*

## 7.NS ~ The Number System

### 7.NS.A Apply and extend previous understandings of operations with fractions to add, subtract, multiply and divide rational numbers.

Lessons  
4.1, 4.2, 4.3, 4.4

Lessons  
4.1, 4.2, 4.3, 4.4

Lessons  
4.1, 4.2, 4.3, 4.4

Lessons  
4.1, 4.2, 4.3, 4.4

- 7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
- a. Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.*
- b. Understand  $p + q$  as the number located a distance  $|q|$  from  $p$ , in the positive or negative direction depending on whether  $q$  is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
- c. Understand subtraction of rational numbers as adding the additive inverse,  $p - q = p + (-q)$ . Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
- d. Apply properties of operations as strategies to add and subtract rational numbers.

Lessons  
5.1, 5.2

Lesson  
5.3

Lessons  
5.1, 5.2, 5.3

Lesson  
3.1

- 7.NS.A.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
- a. Understand that multiplication is extended from fractions to rational numbers by requiring operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as  $(-1)(-1) = 1$  and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
- b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If  $p$  and  $q$  are integers, then  $-\left(\frac{p}{q}\right) = \frac{(-p)}{q} = \frac{p}{(-q)}$ . Interpret quotients of rational numbers by describing real-world contexts.
- c. Apply properties of operations as strategies to multiply and divide rational numbers.
- d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

Lessons  
4.1, 4.2, 4.3, 4.4,  
5.1, 5.2, 5.3, 6.1

7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

## 7.EE ~ Expressions and Equations

### 7.EE.A Use properties of operations to generate equivalent expressions.

Lessons  
6.3, 6.4

7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

Lessons  
6.3, 6.4, 7.2, 7.3

7.EE.A.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example,  $a + 0.05a = 1.05a$  means that “increase by 5%” is the same as “multiply by 1.05.”*

### 7.EE.B Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Lessons  
6.4, 7.2, 7.3

7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional  $\frac{1}{10}$  of her salary an hour; or \$2.50, for a new salary of \$27.50. If you want to place a towel bar  $9\frac{3}{4}$  inches long in the center of a door that is  $27\frac{1}{2}$  inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Lessons  
7.2, 8.1, 8.2

a. Solve word problems leading to equations of the form  $px + q = r$  and  $p(x + q) = r$ , where  $p$ ,  $q$ , and  $r$  are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*

Lesson  
7.4

b. Solve word problems leading to inequalities of the form  $px + q > r$  or  $px + q < r$ , where  $p$ ,  $q$ , and  $r$  are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.*

## 7.G ~ Geometry

### 7.G.A Draw, construct and describe geometrical figures and describe the relationships between them.

Lesson  
1.4

7.G.A.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Lesson  
8.3

7.G.A.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

Lesson  
9.1

7.G.A.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

### 7.G.B Solve real-life and mathematical problems involving angle measure, area, surface area and volume.

Lessons  
8.5, 8.6, 8.7

7.G.B.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

Lessons  
8.1, 8.2

7.G.B.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

Lessons  
8.4, 8.7, 9.1, 9.2,  
9.3, 9.4

7.G.B.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

## 7.SP ~ Statistics and Probability

### 7.SP.A Use random sampling to draw inferences about a population.

Lesson  
10.4

7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

Lessons  
10.4, 10.5

7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*

### 7.SP.B Draw informal and comparative inferences about two populations.

Lesson  
10.5

7.SP.B.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of height is noticeable.*

Lesson  
10.5

7.SP.B.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*

## 7.SP.C Investigate chance processes and develop, use and evaluate probability models.

Lesson  
10.1

**7.SP.C.5** Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around  $\frac{1}{2}$  indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

Lesson  
10.1, 10.2

**7.SP.C.6** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*

Lesson  
10.1, 10.2

**7.SP.C.7** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of discrepancy.

- a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.*
- b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*

Lesson  
10.3

**7.SP.C.8** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

- a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
- b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.
- c. Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood.

# Focus and Connecting Standards Alignment

EdGems Math supports students' proficiency in the Common Core State Standards through a program-design which supports the interconnectivity of mathematical ideas while providing clear learning objectives. This is achieved by designating Focus Standards in each lesson and Connecting Standards in each unit. The qualifiers of Focus and Connecting Standards were developed by the EdGems Math authoring team to design a scope and sequence in which mathematical ideas build upon each other and are revisited throughout the course. Each EdGems Math lesson identifies one or more standards as a Focus Standard to provide a focal point for the lesson objectives. The unit then provides opportunities for further connections to other standards across clusters and domains. These Connecting Standards offer opportunities for students to draw up and apply many mathematical ideas throughout the unit. The following chart shows when each standard is aligned as a Focus Standard or Connecting Standard throughout the course. Further explanations of the Focus and Connecting Standards are available within each Unit Overview.

	Focus Standard Lesson(s)	Connecting Standard Unit(s)
7.RP.A.1	Lessons 1.1-1.3	Units 2, 5, 6, 7, 10
7.RP.A.2	Lessons 2.1, 2.3-2.4	Units 3, 6, 7, 8, 10
7.RP.A.3	Lessons 2.2, 3.2-3.4, 10.2	Units 5, 6, 7, 8, 9
7.NS.A.1	Lessons 4.1-4.4	Units 2, 3, 5, 6, 7, 8, 9, 10
7.NS.A.2	Lessons 3.1, 5.1-5.3	Units 1, 2, 4, 6, 7, 8, 9, 10
7.NS.A.3	Lessons 4.1-4.4, 5.1-5.3, 6.1	Units 1, 2, 3, 7, 8, 9, 10
7.EE.A.1	Lessons 6.3-6.4	Units 4, 5, 7, 8, 9
7.EE.A.2	Lessons 6.3-6.4, 7.2-7.3	Units 2, 3, 5
7.EE.B.3	Lessons 6.4, 7.2-7.3	Units 4, 5, 8, 9, 10
7.EE.B.4	Lessons 7.2, 7.4, 8.1, 8.2	Units 2, 3, 9, 10
7.G.A.1	Lesson 1.4	Units 2, 9

	Focus Standard Lesson(s)	Connecting Standard Unit(s)
7.G.A.2	Lesson 8.3	
7.G.A.3	Lesson 9.1	
7.G.B.4	Lessons 8.5-8.6, 8.7	
7.G.B.5	Lessons 8.1-8.2	
7.G.B.6	Lessons 8.4, 8.7, 9.1-9.4	Units 1, 2, 6, 7, 10
7.SP.A.1	Lesson 10.4	
7.SP.A.2	Lessons 10.4-10.5	Units 4, 5
7.SP.B.3	Lesson 10.5	Unit 5
7.SP.B.4	Lesson 10.5	Units 4, 5
7.SP.C.5	Lesson 10.1	
7.SP.C.6	Lessons 10.1-10.2	
7.SP.C.7	Lessons 10.1-10.2	
7.SP.C.8	Lesson 10.3	

# Focus Standards Alignment by Lesson

Unit	Lesson	Focus Content Standard(s)	Focus SMP	Unit	Lesson	Focus Content Standard(s)	Focus SMP
Ratios and Rates	1.1	7.RP.A.1	SMP4	Algebraic Expressions	6.1	7.NS.A.3	SMP8
	1.2	7.RP.A.1	SMP2		6.2	6.EE.A.2	SMP6
	1.3	7.RP.A.1	SMP3		6.3	7.EE.A.1/7.EE.A.2	SMP7
	1.4	7.G.A.1	SMP5		6.4	7.EE.A.1/7.EE.A.2/ 7.EE.B.3	SMP1
Proportional Relationships	2.1	7.RP.A.2a	SMP3	Equations and Inequalities	7.1	6.EE.B.7	SMP5
	2.2	7.RP.A.3	SMP2		7.2	7.EE.A.2/7.EE.B.3/ 7.EE.B.4a	SMP2
	2.3	7.RP.A.2a,b,d	SMP3		7.3	7.EE.A.2/7.EE.B.3	SMP2
	2.4	7.RP.A.2	SMP8		7.4	7.EE.B.4b	SMP4
Percents	3.1	7.NS.A.2d	SMP8	Two-Dimensional Geometry	8.1	7.EE.B.4a/7.G.B.5	SMP7
	3.2	7.RP.A.3	SMP1		8.2	7.EE.B.4a/7.G.B.5	SMP1
	3.3	7.RP.A.3	SMP6		8.3	7.G.A.2	SMP3
	3.4	7.RP.A.3	SMP2		8.4	7.G.B.6	SMP4
Sums and Differences of Rational Numbers	4.1	7.NS.A.1/7.NS.A.3	SMP5		8.5	7.G.B.4	SMP5
	4.2	7.NS.A.1/7.NS.A.3	SMP3		8.6	7.G.B.4	SMP6
	4.3	7.NS.A.1/7.NS.A.3	SMP4		8.7	7.G.B.4/7.G.B.6	SMP7
	4.4	7.NS.A.1/7.NS.A.3	SMP6	Three-Dimensional Geometry	9.1	7.G.A.3/7.G.B.6	SMP5
Products and Quotients of Rational Numbers	5.1	7.NS.A.2a,c/7.NS.A.3	SMP8		9.2	7.G.B.6	SMP2
	5.2	7.NS.A.2a,c/7.NS.A.3	SMP3		9.3	7.G.B.6	SMP4
	5.3	7.NS.A.2b,c/7.NS.A.3	SMP7		9.4	7.G.B.6	SMP3
Probability and Statistics	10.1	7.SP.C.5/7.SP.C.6/ 7.SP.C.7	SMP3	Probability and Statistics	10.2	7.RP.A.3/7.SP.C.6/ 7.SP.C.7	SMP2
	10.2	7.SP.C.8	SMP8		10.3	7.SP.C.8	SMP8
	10.3	7.SP.A.1/7.SP.A.2	SMP1		10.4	7.SP.A.1/7.SP.A.2	SMP1
	10.4	7.SP.A.2/7.SP.B.3/ 7.SP.B.4	SMP4		10.5	7.SP.A.2/7.SP.B.3/ 7.SP.B.4	SMP4
	10.5	7.SP.A.2/7.SP.B.3/ 7.SP.B.4	SMP4				

Major Standard
  Supporting Standard
  Additional Standard
  Pre-Requirement

# Standards for Mathematical Practice Alignment

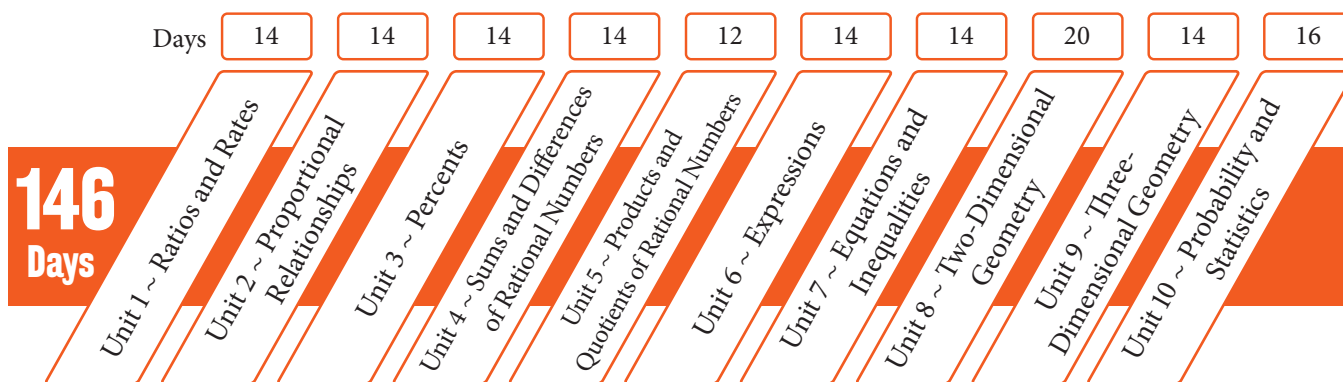
The Standards for Mathematical Practice (SMPs) are integrated throughout the entirety of the EdGems Math curriculum. While every lesson provides specific implementation guidance for the SMPs in the Teacher Guide, each lesson also has a Focus Math Practice Standard. The correlation between these Focus Math Practices and student lessons is shown in the table below. There are also opportunities for each SMP to be formatively assessed during the listed unit's Storyboards and Performance Task. Additionally, there are opportunities for each SMP to be summatively assessed during the Performance Assessment in the listed unit or units.

SMP	Student Lessons	Storyboards	Performance Tasks	Performance Assessments
<b>SMP1</b> <i>Make sense of problems and persevere in solving them.</i>	3.2, 6.4, 8.2, 10.4	Unit 1	Unit 2	Unit 5
<b>SMP2</b> <i>Reason abstractly and quantitatively.</i>	1.2, 2.2, 3.4, 7.2, 7.3, 9.2, 10.2	Units 3, 4	Unit 6	Unit 7
<b>SMP3</b> <i>Construct viable arguments and critique the reasoning of others.</i>	1.3, 2.1, 2.3, 4.2, 5.2, 8.3, 9.4, 10.1	Units 7, 10	Unit 8	Unit 6
<b>SMP4</b> <i>Model with mathematics.</i>	1.1, 4.3, 7.4, 8.4, 9.3, 10.5	Unit 8	Units 1, 9	Units 2, 10
<b>SMP5</b> <i>Use appropriate tools strategically.</i>	1.4, 4.1, 7.1, 8.5, 9.1	Unit 9	Unit 10	Unit 8
<b>SMP6</b> <i>Attend to precision.</i>	3.3, 4.4, 6.2, 8.6	Unit 5	Unit 3	Unit 4
<b>SMP7</b> <i>Look for and make use of structure.</i>	5.3, 6.3, 8.1, 8.7	Unit 6	Unit 7	Units 1, 9
<b>SMP8</b> <i>Look for and express regularity in repeated reasoning.</i>	2.4, 3.1, 5.1, 6.1, 10.3	Unit 2	Units 4, 5	Unit 3

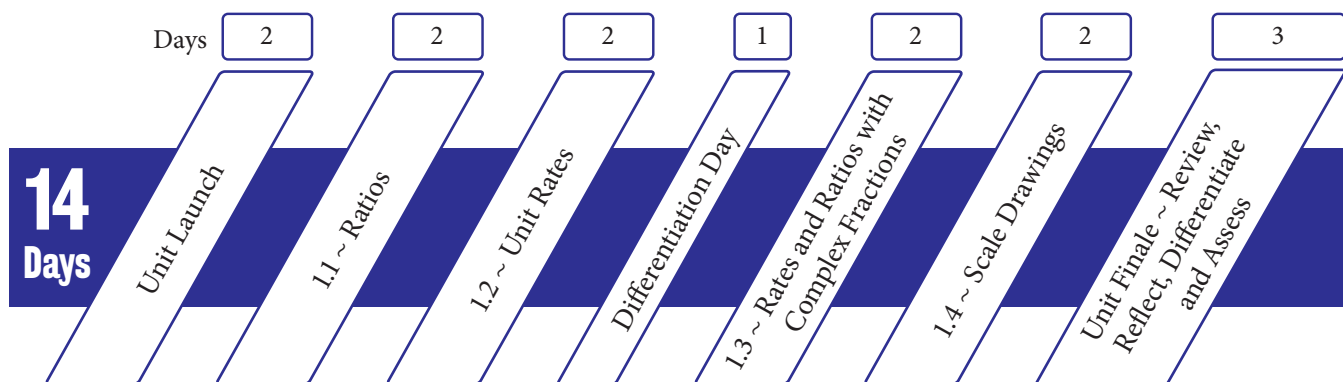
## Pacing Guide

This Course 1 Pacing Guide is based on daily 45-60 minute math class periods. Each unit includes days for the Unit Launch, lessons, Differentiation Days and Unit Finale (which includes assessment). Any additional days beyond the 146 days allow for flexibility in the pacing calendar to include such things as (1) beginning of the year activities, (2) state assessment preparation and (3) benchmark/state assessments.

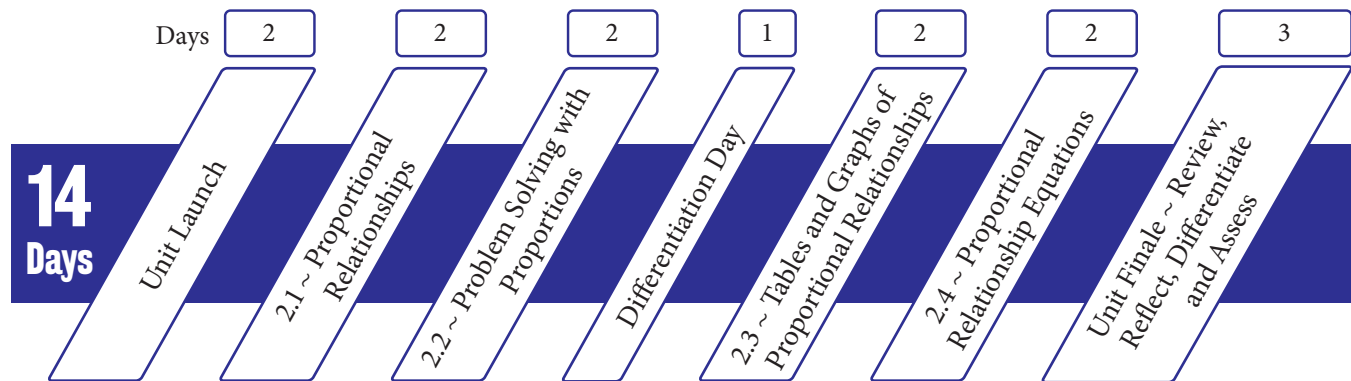
### Year at a Glance



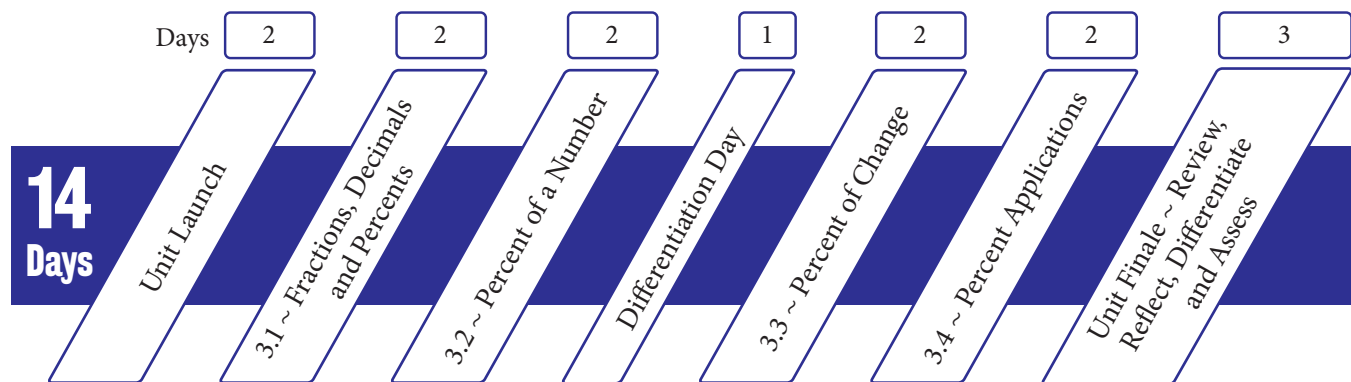
### Unit 1 ~ Ratios and Rates



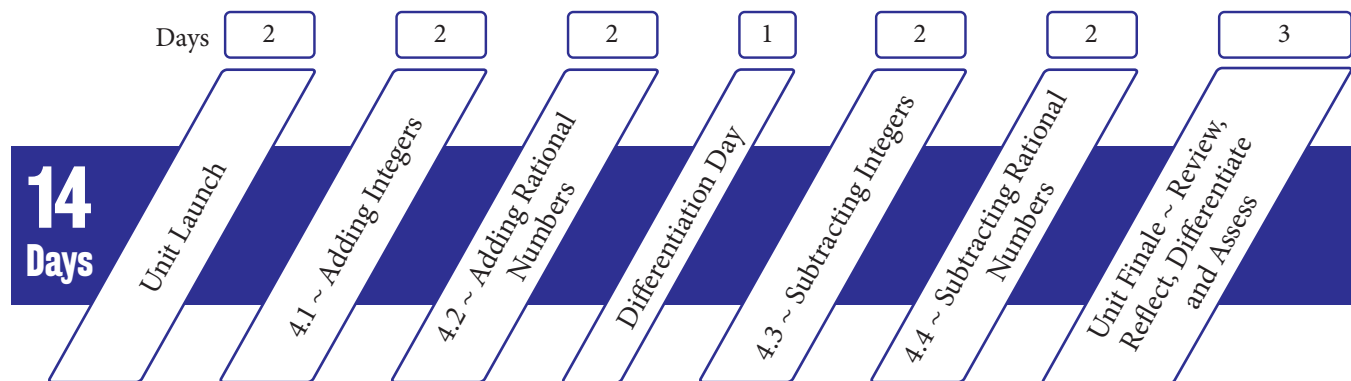
## Unit 2 ~ Proportional Relationships



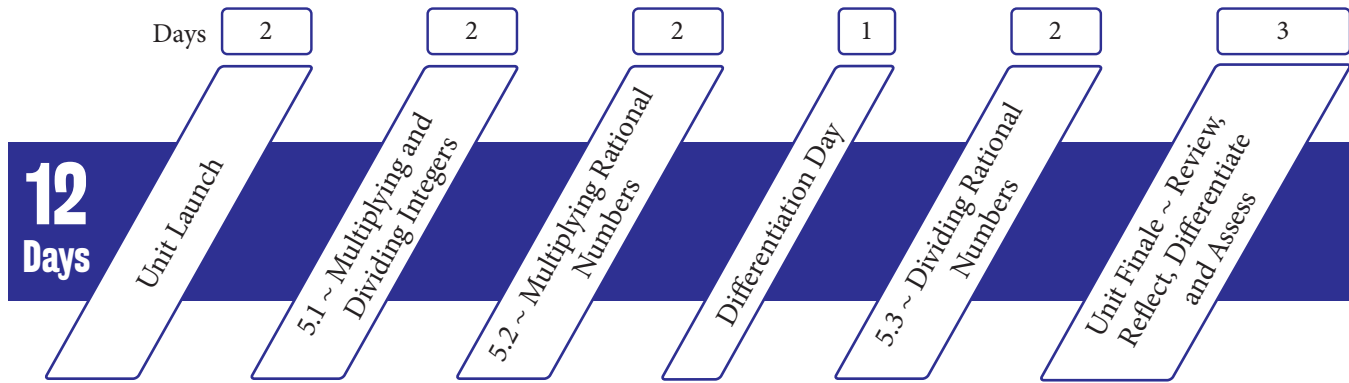
## Unit 3 ~ Percents



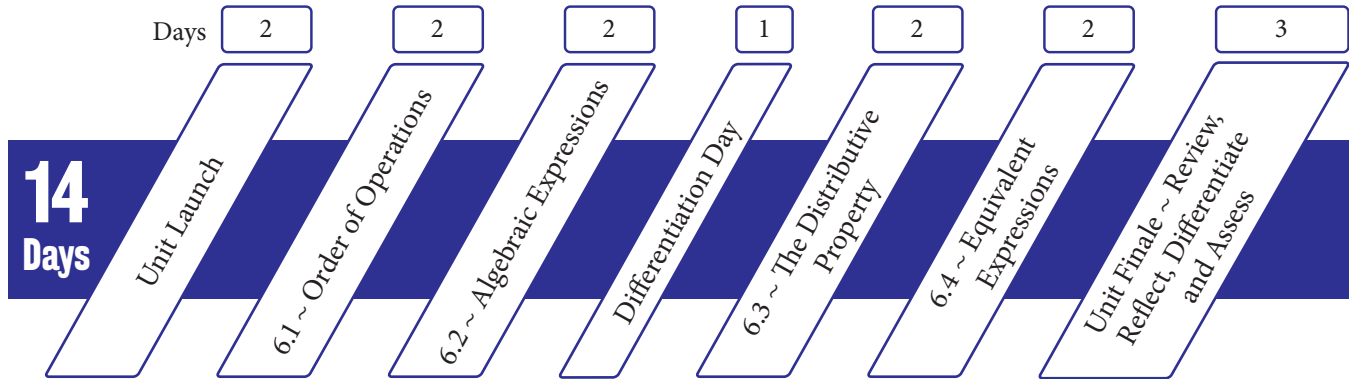
## Unit 4 ~ Sums and Differences of Rational Numbers



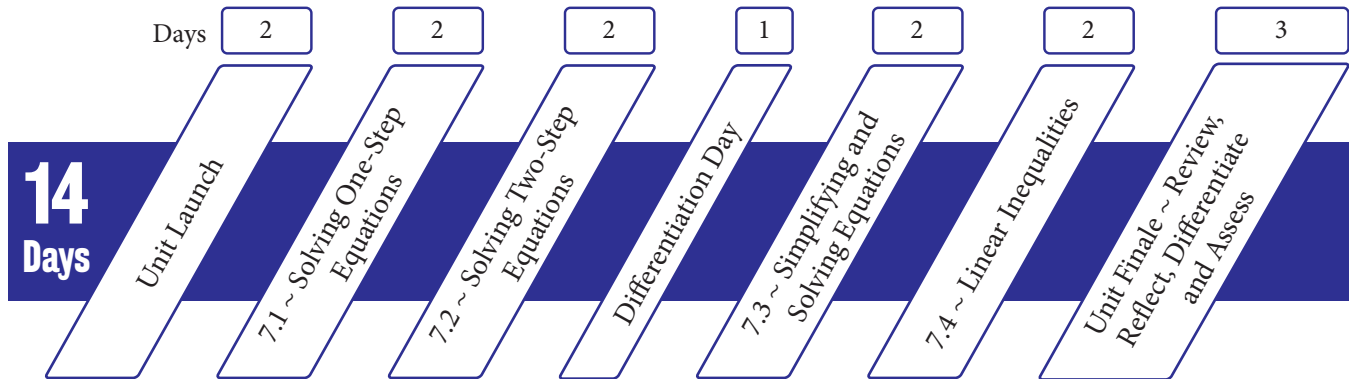
# Unit 5 ~ Products and Quotients of Rational Numbers



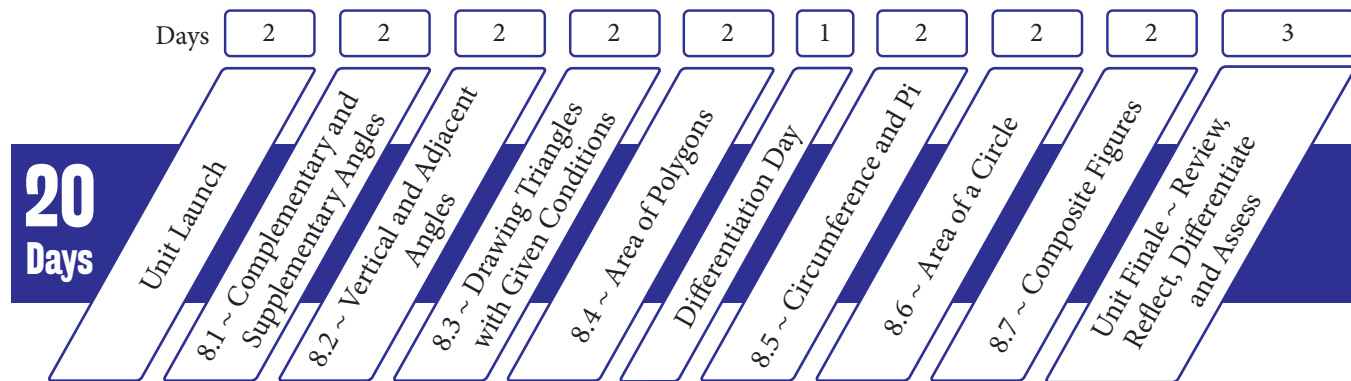
# Unit 6 ~ Expressions



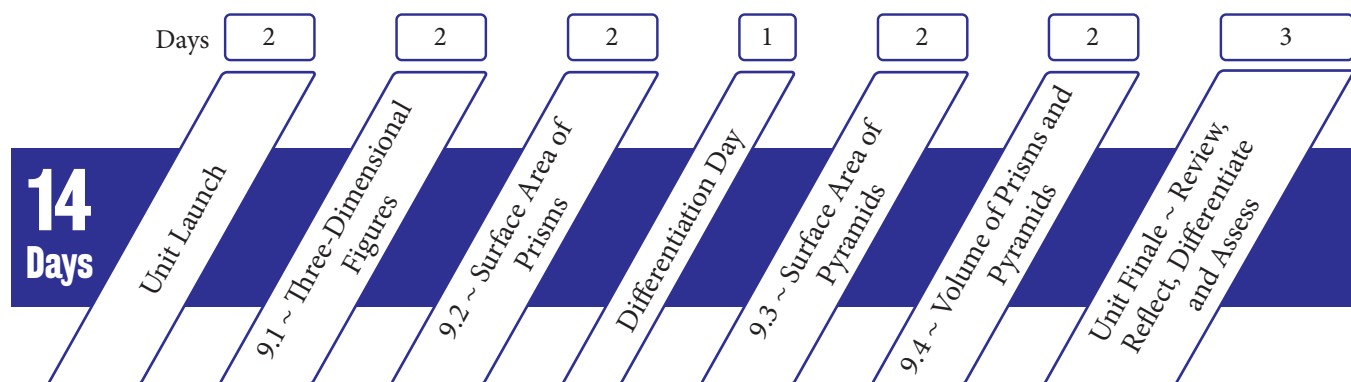
# Unit 7 ~ Equations and Inequalities



## Unit 8 ~ Two-Dimensional Geometry



## Unit 9 ~ Three-Dimensional Geometry



## Unit 10 ~ Probability and Statistics

