Orange Public Schools

Office of Curriculum & Instruction

2019-2020 Mathematics Curriculum Guide

6th Grade Mathematics

Math in Focus - Unit 2: Ratios & Proportional Relationships

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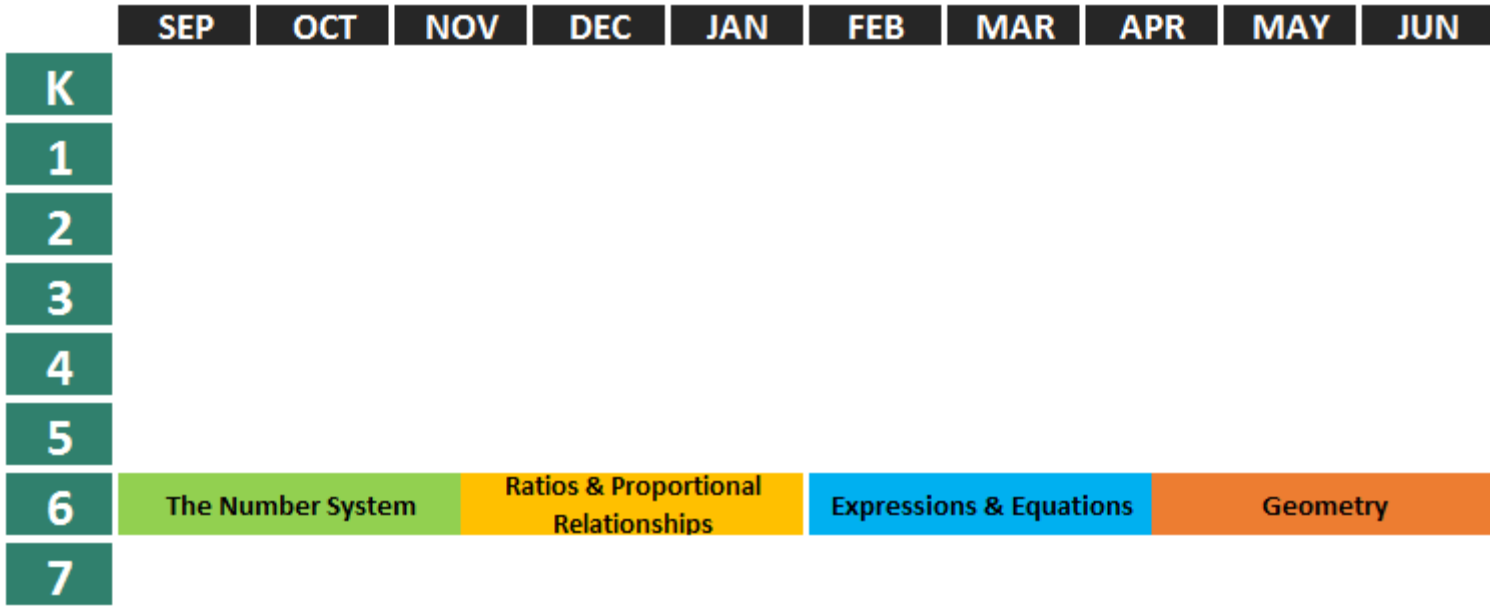
A STORY OF UNITS



The Number System: Division of fractions, computation of multi-digit numbers, and the system of rational numbers

Ratios & Proportional Relationships: Understand ratio concepts and use ratio reasoning to solve problems

Expressions & Equations: Arithmetic with algebraic expressions, solve simple equations/ inequalities, and analyze relationships

Geometry: Solve real-world and mathematical problems involving area, surface area, and volume

Table of Contents

References

"Math in Focus" *Houghton Mifflin Harcourt.* 2015 <https://my.hrw.com>

I. Unit Overview

In this unit students will …

- Strengthen sense of and understanding of proportional reasoning
- Develop and use multiplicative thinking
- Develop the understanding that a ratio is a comparison of two numbers or quantities
- Find percent using the same processes for solving rates and proportions
- Solve real-life problems involving measurement units that need to be converted

Essential Questions

- What is the connection between a ratio and a fraction?
- How is a ratio or rate used to compare two quantities or values?
- How and where are ratios and rates used in the real world?
- How can I model and represent rates and ratios?
- What are similarities and differences between fractions and ratios?
- How does comparing quantities describe the relationship between them?
- How are rates and unit rates used in the real world?
- How is a unit rate similar to and different from a ratio?
- Why is it important to know how to solve for unit rates?

Enduring Understanding

- Reasoning with ratios involves attending to and coordinating two quantities.
- A ratio is a multiplicative comparison of two quantities, or it is a joining of two quantities in a composed unit.
- Equivalent ratios can be represented in a table, double number line, or a tape diagram.
- Forming a ratio as a measure of a real-world attribute involves isolating that attribute from other attributes and understanding the effect of changing each quantity on the attribute of interest.
- A number of mathematical connections link ratios and fractions:
    - Ratios are often expressed in fraction notation, although ratios and fractions do not have identical meaning.
    - Ratios are often used to make “part-part” comparisons, but fractions are not.
    - Ratios can often be meaningfully reinterpreted as fractions.
- Ratios can be meaningfully reinterpreted as quotients.
- A rate is a set of infinitely many equivalent ratios.
- A unit rate is a special ratio with a denominator of one that compares different types of measures.
- Proportional relationships express how quantities change in relationship to each other.
- A percent is a special kind of ratio in which a part is compared to a whole with 100 parts.
- Some percentages can be approximated by simple fractions and used to estimate the percent of a number.

II. Pacing Guide

Activity	New Jersey Student Learning Standards (NJSLS)	Estimated Time
Chapter 1		
Chapter 4 Recall Prior Knowledge / Pre-Test (MIF)	6.RP.1, 6.RP.3, 6.RP.3a, 6.RP.3d	1 Block
Chapter 4 (MIF) Transition Lesson	6.RP.1, 6.RP.3, 6.RP.3a, 6.RP.3d	1 Block
Chapter 4 (MIF) Lesson 4.1	6.RP.1, 6.RP.3d	2 Blocks
Chapter 4 (MIF) Lesson 4.2	6.RP.3a	2 Blocks
Chapter 4 (MIF) Lesson 4.3	6.RP.3a	2 Blocks
Chapter 4 (MIF) Wrap-Up / Review	6.RP.1, 6.RP.3, 6.RP.3a, 6.RP.3d	2 Blocks
Chapter 4 Assessment (MIF) *Optional*	6.RP.1, 6.RP.3, 6.RP.3a, 6.RP.3d	1 Block *Optional*
Total Time		**11 Blocks**

Major Work Supporting Content Additional Content

Activity	New Jersey Student Learning Standards (NJSLS)	Estimated Time
Chapter 2		
Chapter 5 Recall Prior Knowledge / Pre-Test (MIF)	6.NS.1, 6.NS.2, 6.RP.1, 6.RP.3d	1 Block
Chapter 5 (MIF) Transition Lesson	6.NS.1, 6.NS.2, 6.RP.1, 6.RP.3d	1 Block
Chapter 5 (MIF) Lesson 5.1	6.RP.2, 6.RP.3	2 Blocks
Chapter 5 (MIF) Lesson 5.2	6.RP.3, 6.RP.3b	2 Blocks
Chapter 5 (MIF) Wrap-Up / Review	6.NS.1, 6.NS.2, 6.RP.1, 6.RP.2, 6.RP.3, 6.RP.3b, 6.RP.3d	2 Blocks
Chapter 5 Assessment (MIF) *Optional*	6.NS.1, 6.NS.2, 6.RP.1, 6.RP.2, 6.RP.3, 6.RP.3b, 6.RP.3d	1 Block *Optional*
Unit 2 Assessment 1		1 Block
Total Time		**9 Blocks**

Major Work Supporting Content Additional Content

Activity	New Jersey Student Learning Standards (NJSLS)	Estimated Time
Chapter 3		
Chapter 6 Recall Prior Knowledge / Pre-Test (MIF)	6.RP.3, 6.RP.3c	1 Block
Chapter 6 (MIF) Transition Lesson	6.RP.3, 6.RP.3c	1 Block
Chapter 6 (MIF) Lesson 6.1	6.RP.3, 6.RP.3c	2 Blocks
Chapter 6 (MIF) Lesson 6.2	6.RP.3c	2 Blocks
Chapter 6 (MIF) Lesson 6.3	6.RP.3c	2 Blocks
Chapter 6 (MIF) Lesson 6.4	6.RP.3c, 7.RP.3	2 Blocks
Chapter 6 (MIF) Lesson 6.5	6.RP.3c, 7.RP.3	2 Blocks
Chapter 6 (MIF) Wrap-Up / Review	6.RP.3, 6.RP.3c, 7.RP.3	2 Blocks
Chapter 6 Assessment (MIF) *Optional*	6.RP.3, 6.RP.3c, 7.RP.3	1 Block *Optional*
Unit 2 Assessment 2		1 Block
Total Time		**15 Blocks**

Major Work Supporting Content Additional Content

Unit 2 Overview		
Activity	**New Jersey Student Learning Standards (NJSLS)**	**Estimated Time**
Chapter 4 (MIF)	6.RP.1, 6.RP.3, 6.RP.3a, 6.RP.3d	11 Blocks
Chapter 5 (MIF)	6.NS.1, 6.NS.2, 6.RP.1, 6.RP.2, 6.RP.3, 6.RP.3b, 6.RP.3d	9 Blocks
Chapter 6 (MIF)	6.RP.3, 6.RP.3c, 7.RP.3	15 Blocks
Solidify Unit 2 Concepts / ***(Project Based Learning)***		5 Blocks
Total Time		**40 Blocks**

Major Work Supporting Content Additional Content

III. Pacing Calendar

Please complete the pacing calendar based on the suggested pacing (*see Pacing Guide on pages 2-3)*.

NOVEMBER						
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
					1	**2**
3	**4**	**5**	**6**	**7**	**8**	**9**
10	**11**	**12**	**13**	**14**	**15**	**16**
17	**18**	**19**	**20**	**21**	**22**	**23**
24	**25**	**26**	**27**	**28**	**29**	**30**

DECEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	**2**	**3**	***4***	**5**	**6**	**7**
8	**9**	**10**	**11**	**12**	**13**	**14**
15	**16**	**17**	**18**	**19**	**20**	**21**
22	**23**	**24**	**25**	**26**	**27**	**28**
29	**30**	**31**				

JANUARY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7	8	9	10	11
12	*13*	*14*	*15*	*16*	*17*	18
19	*20*	*21*	*22*	*23*	*24*	25
26	*27*	*28*	*29*	*30*	*31*	

IV. Math Background

Chapter 4: Ratio

In this chapter, students will

- Extend concepts learned with fractions to ratios. Along with writing equivalent ratios and writing ratios in simplest form, they learn to use comparison models and unitary method to solve many types of ratio problems.

- In addition to solving ratio problems involving two quantities, students will solve problems involving three quantities.

  Ex: A band includes students from 6th grade, 7th grade, and 8th grade in the ratio 4: 3: 5. There are 156 students in the band. How many students are in 8th grade?

- Students will solve problems involving two related sets of ratios.

  Ex: The ratio of Ty's age to Kim's age is 3:4. The ratio of Kim's age to Luz's age is 8:5. Luz is 10 years old. How old is Ty?

- Students will also solve problems involving ratios that change.

  Ex: Last year, the ratio of Ariel's CDs to Dora's was 2:5. This year, Ariel got another 99 CDs and Dora got 33. The ratio is now 5:6 and Ariel has the same number of CDs as Dora had last year. How many CDs does Ariel have this year

Chapter 5: Rates

In this chapter, students will extend their knowledge of ratios to the concept of rates.

- Use the unitary method and bar models to find rates and unit rates, while solving real-world rate problems.
- Students will encounter three types of rates: unit rates, rates that vary over time, and average rates.
- Bar models help students to visualize more complex rate problems. The unitary method provides them with a solution strategy that works.
- Through the use of word problems and a table, students will work with the formula d = s x t, or distance = speed x time.

  A car travels at a speed (*s*) of 40 miles per hour. Find the distance (*d*) the car travels in each (*t*).
- Average speed problems are used in business, science, and other applications, and the idea of a rate forms a basis for calculus.
- Determine average speed by dividing the total distance by the total time.

Chapter 6: Percent

In this chapter, students learn to

- Use bar models to visualize percent and solve problems using both unitary method and traditional method.
- Students learn that percent means “per hundred” or “out of 100,”
- Understand the concept of *base*, and that percent has a base of 100.
- Given a part of a whole, students use a bar model and the unitary method to find the percent represented by the part.
- Find a part given its percent and the whole / Find the whole given a part and its percent.
- Determine percent decrease and increase/ Find amount of increase or decrease.

V. NJSLA Assessment Evidence Statements

NJSLS	Evidence Statement	Clarification	Math Practices	Calculator ?
6.RP.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."	i) Expectations for ratios in this grade are limited to ratios of non-complex fractions. (See footnote, CCSS p 42.) The initial numerator and denominator should be whole numbers.	MP. 2	No
6.RP.2	Understand the concept of a unit rate a/b associated with a ratio a:b with b≠0, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."	i) Expectations for unit rates in this grade are limited to non-complex fractions. (See footnote, CCSS p 42.) The initial numerator and denominator should be whole numbers.	MP. 2	No
6.RP.3a	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the	The testing interface can provide students with a calculation aid of the specified kind for these tasks. i) Expectations for ratios in this grade are limited to ratios of non-complex fractions. (See footnote, CCSS p 42.) The initial numerator and denominator should be whole numbers.	MP. 2 MP. 4 MP. 5 MP. 7 MP. 8	Yes

	tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.			
6.RP.3b	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?	i) See ITN Appendix F, Table F.c, "Minimizing or avoiding common drawbacks of selected response," specifically, Illustration 1 (in contrast to the problem "A bird flew 20 miles in 100 minutes. At that speed, how long would it take the bird to fly 6 miles?") ii) The testing interface can provide students with a calculation aid of the specified kind for these tasks. iii) Expectations for unit rates in this grade are limited to non-complex fractions. (See footnote, CCSS p 42) iv) The initial numerator and denominator should be whole numbers.	MP. 2 MP. 8 MP. 5	Yes
6.RP.3c 1	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity).	i) The testing interface can provide students with a calculation aid of the specified kind for these tasks. ii) Pool should contain tasks with and without contexts iii) Expectations for ratios in this grade are limited to ratios of non-complex fractions. (See footnote, CCSS p 42.) The initial numerator and denominator should be whole numbers.	MP. 2 MP. 7 MP. 5 MP. 8	Yes

6.RP.3c-2	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. c. Solve problems involving finding the whole, given a part and the percent.	i) The testing interface can provide students with a calculation aid of the specified kind for these tasks. ii) Expectations for ratios in this grade are limited to ratios of non-complex fractions. (See footnote, CCSS p 42.) The initial numerator and denominator should be whole numbers.	MP. 2 MP. 7 MP. 5 MP. 8	Yes
6.RP.3d	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	i) Pool should contain tasks with and without contexts ii) Tasks require students to multiply and/or divide dimensioned quantities iii) 50% of tasks require students to correctly express the units of the result. The testing interface can provide students with a calculation aid of the specified kind for these tasks. iv) Expectations for ratios in this grade are limited to ratios of non-complex fractions. (See footnote, CCSS p 42.) The initial numerator and denominator should be whole numbers.	MP. 2 MP. 6 MP. 7 MP. 5 MP. 8	Yes
6.NS.1-2	Solve word problems involving division of fractions by fractions, For example, How much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular	i) Only the answer is required; explanations and representations are not assessed here. ii) Note that the italicized examples correspond to three meanings/uses of division: (1) equal sharing; (2) measurement; (3) unknown factor. These meanings/uses	MP.4	No

	strip of land with length 3/4 mi and area 1/2 square mi?	of division should be sampled equally. iii) Tasks may involve fractions and mixed numbers but not decimals		
6.NS.2	Fluently divide multi-digit numbers using the standard algorithm.	i) Tasks access fluency implicitly; simply in virtue of the fact that there are two substantial computations on the EOY (see also 6.NS.3-1, 6.NS.3-2, 6.NS.3-3, 6.NS.3-4). Tasks need not be timed. ii) The given dividend and divisor are such as to require an efficient/standard algorithm (e.g., 40584 ÷ 76). Numbers in the task do not suggest any obvious ad hoc or mental strategy (as would be present for example in a case such as 40064 ÷ 16). iii) Tasks do not have a context. iv) Only the answer is required. v) Tasks have five-digit dividends and two-digit divisors, with or without remainders.	–	No

VI. Differentiated Instruction

Chapter 4

Assessment and Intervention

	ASSESSMENT	RtI STRUGGLING LEARNERS
DIAGNOSTIC	• Quick Check in Recall Prior Knowledge in Student Book A, pp. 115–117 • Chapter 4 Pre-Test in *Assessments*	• Skills 11–16 in *Transition Guide, Course 1*
ON-GOING	• Guided Practice • Lesson Check • Ticket Out the Door	• Reteach worksheets • Extra Practice worksheets • *Activity Book*, Chapter 4
END-OF-CHAPTER	• Chapter Review/Test • Chapter 4 Test in *Assessments* • ExamView® Assessment Suite CD-ROM Course 1	• Reteach worksheets

ELL ENGLISH LANGUAGE LEARNERS

Review the terms *ratio* and *term*.

Model Draw a group of 4 circles. Next to it draw a group of 3 squares. Under the groups, write "4 : 3", "4 to 3", and "ratio".

Say A *ratio* compares two numbers or amounts. This ratio compares the number of circles to the number of squares. There are four circles for every three squares. (Point to 4 : 3.) You say and read this ratio as "four to three".

Say (Circle the 4 and 3 in 4 : 3.) Each number in a ratio is called a *term*. The terms in the ratio 4 : 3 are 4 and 3.

Say If the ratio of A to B is 3 : 4, then A is $\frac{3}{4}$ of B.

For definitions, see Glossary, page 272, and Online Multilingual Glossary.

ADVANCED LEARNERS

- Adjusting a recipe to serve fewer or more people is an everyday activity that involves the application of equivalent ratios. Students can find recipes that serve 4 people and scale them down or up to yield a lesser or greater number of servings.
- As needed, provide direction for students. You may want to suggest that, as a warm up, students first take their recipe and scale it down to serve 1 or 2 people, then scale it up to serve 6 or 12. For a greater challenge, suggest they scale up the recipe so that it will serve 7 or 9 people.
- Finally, it may be fun for students to scale up the recipe so that it makes enough food to serve the entire class. In that case, ask students to do unit conversions to larger units where appropriate (i.e., from 28 teaspoons to $9\frac{1}{3}$ tablespoons).

To provide additional challenges use:

- *Enrichment*, Chapter 4
- Student Book A, Brain@Work problems

Chapter 5

Assessment and Intervention

	ASSESSMENT	RtI STRUGGLING LEARNERS
DIAGNOSTIC	• Quick Check in Recall Prior Knowledge in Student Book A, pp. 155–158 • Chapter 5 Pre-Test in *Assessments*	• Skills 10, 17–23 in *Transition Guide, Course 1*
ON-GOING	• Guided Practice • Lesson Check • Ticket Out the Door	• Reteach worksheets • Extra Practice worksheets • *Activity Book*, Chapter 5
END-OF-CHAPTER	• Chapter Review/Test • Chapter 5 Test in *Assessments* • ExamView® Assessment Suite CD-ROM Course 1	• Reteach worksheets

ELL ENGLISH LANGUAGE LEARNERS

Review the terms *rate* and *unit rate*.

Say A rate is a type of ratio. A *rate* describes one quantity in terms of another. For example, in 9 games, a basketball player scores a total of 45 points. (Write $\frac{45 \text{ points}}{9 \text{ games}}$.) The rate relates the number of points scored to the number of games they were scored in.

Say A *unit rate* is a rate with the denominator 1. To find the basketball player's unit rate, we divide both the numerator (top number) and denominator (bottom number) of the fraction by the same number.

Model Write "÷ 9" next to both the numerator and the denominator. Then write an equal sign and the equivalent fraction, $\frac{5 \text{ points}}{1 \text{ game}}$.

Say $\frac{5 \text{ points}}{1 \text{ game}}$ is a unit rate. You can think of it as meaning 5 points *per* game, or 5 points *divided by* 1 game, or as a fraction whose denominator is 1.

For definitions, see Glossary, page 272, and Online Multilingual Glossary.

ADVANCED LEARNERS

- Have students find and explain the error made by Luke in the following dialogue. Ask them to write a response from Rob that explains and corrects the error. Sample response: No. You're making the mistake of adding my rate to my aunt's house to my rate from my aunt's house, and finding the average of those rates. Instead you find the total distance and divide by the total time. 60 + 60 = 120 miles. Divide 120 miles by 3 hours to get an average speed of 40 miles per hour.

  Rob: It took me an hour to drive 60 miles from my house to my aunt's house on Friday. But when I drove the 60 miles back home, it was snowing so hard it took me 2 hours.

  Luke: So your average speed for the round trip was 45 miles per hour.

To provide additional challenges use:

- *Enrichment*, Chapter 5
- Student Book A, Brain@Work problem

Chapter 6

Assessment and Intervention

	ASSESSMENT	RtI STRUGGLING LEARNERS
DIAGNOSTIC	• Quick Check in Recall Prior Knowledge in Student Book A, pp. 183–184 • Chapter 6 Pre-Test in *Assessments*	• Skills 24–27 in *Transition Guide, Course 1*
ON-GOING	• Guided Practice • Lesson Check • Ticket Out the Door	• Reteach worksheets • Extra Practice worksheets • *Activity Book*, Chapter 6
END-OF-CHAPTER	• Chapter Review/Test • Chapter 6 Test in *Assessments* • ExamView® Assessment Suite CD-ROM Course 1	• Reteach worksheets

ELL ENGLISH LANGUAGE LEARNERS

Review the term *percent*.

Model Show a 10-by-10 grid with 25 squares shaded. Label it "25%, or $\frac{25}{100}$." Point to the percent, the fraction, and then the shaded grid.

Say A *percent* is a ratio of a number to 100. *Percent* means "per hundred." For example, 25% means "25 per hundred," or "25 out of 100."

Model Show a 10-by-10 grid with 100 squares shaded. Label it "100%, or $\frac{100}{100}$." Point to the percent, the fraction, and then the shaded grid.

Say 100% means "100 per hundred," or "100 out of 100." To have 100% of something means to have "all of it," or "the whole amount."

For definitions, see Glossary, page 272, and Online Multilingual Glossary.

ADVANCED LEARNERS

- Students can ask a survey question and display the results as a circle graph. Have them survey at least 12 friends, classmates, or family members. Suggest students write a question with a limited number of answers. For example: What is your favorite type of movie? How many children are in your family? How many pets do you have?
- Have students find the percent of the group surveyed that gave each response, and then make a circle graph to display the percent data.
- As needed, provide direction for students. Show them how to use a compass and protractor. Explain that to find the number of degrees of the circle that represents each percent, they must convert the percents, which are base-100, to base-360. To do that they must multiply each percent by 3.6.

To provide additional challenges use:

- *Enrichment*, Chapter 6
- Student Book A, Brain@Work problems

VII. Connections to the Mathematical Practices

1	Make sense of problems and persevere in solving them
	- Make sense of real-world rate and proportion problem situations by representing the context in tactile and/or virtual manipulatives, visual, or algebraic models - Understand the problem context in order to translate them into ratios/rates
2	Reason abstractly and quantitatively
	- Understand the relationship between two quantities in order to express them mathematically - Use ratio and rate notation as well as visual models and contexts to demonstrate reasoning
3	Construct viable arguments and critique the reasoning of others
	- Construct and critique arguments regarding the proportion of a whole as represented in the context of real-world situations - Construct and critique arguments regarding appropriateness of representations given ratio and rate contexts, EX: does a tape diagram adequately represent a given ratio scenario
4	Model with mathematics
	– Model a problem situation symbolically (tables, expressions, or equations), visually (graphs or diagrams) and contextually to form real-world connections
5	Use appropriate tools strategically
	– Choose appropriate models for a given situation, including tables, expressions or equations, tape diagrams, number line models, etc.
6	Attend to precision
	- Use and interpret mathematical language to make sense of ratios and rates - Attend to the language of problems to determine appropriate representations and operations for solving real-world problems. - Attend to the precision of correct decimal placement used in real-world problems
7	Look for and make use of structure
	- Use knowledge of problem solving structures to make sense of real world problems - Recognize patterns that exist in ratio tables, including both the additive and multiplicative properties - Use knowledge of the structures of word problems to make sense of real-world problems

8	Look for and express regularity in repeated reasoning - Utilize repeated reasoning by applying their knowledge of ratio, rate and problem solving structures to new contexts - Generalize the relationship between representations, understanding that all formats represent the same ratio or rate - Demonstrate repeated reasoning when dividing fractions by fractions and connect the inverse relationship to multiplication – Use repeated reasoning when solving real-world problems using rational numbers

VIII. Vocabulary

Term	Definition
Chapter 4 Vocabulary	
Equivalent Ratios	Ratios that are of different forms but have the same value when simplified.
Ratio	A comparison of two or more numbers or quantities. It describes the relative sizes of the number or quantities.
Simplest Form (of a ratio)	A ratio whose term is a whole number and have no common factor other than 1.
Term (of a ratio)	The numbers or quantities that are being compared in a ratio.
Chapter 5 Vocabulary	
Average Speed	The average distance traveled per unit time.
Rate	A ratio that compares two quantities with different units.
Speed	A special rate that expresses distance per unit time.
Unit Rate	A ratio that compares a quantity to one unit of a different quantity.
Chapter 6 Vocabulary	
Base (of a percent)	The whole quantity of which a percent is found.
Commission	A percent of the total sales earned by a salesperson.
Discount	The amount by which an original price of something is reduced.
Interest	The amount charged for borrowing money, or the amount of money earned from savings or investments.

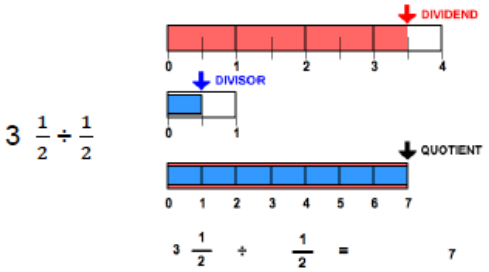
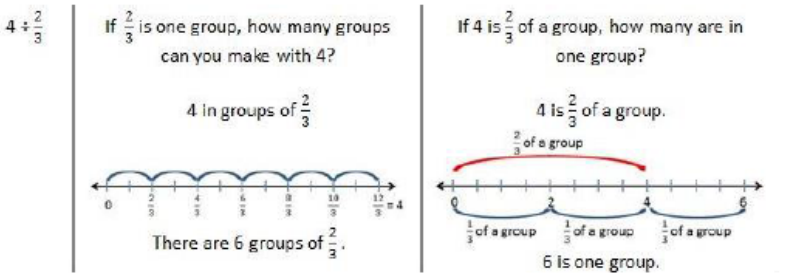
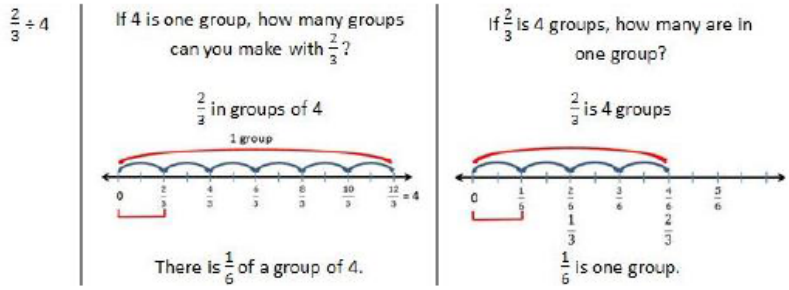
IX. Potential Student Misconceptions

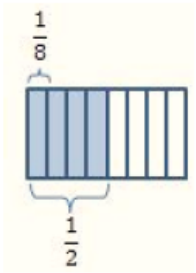
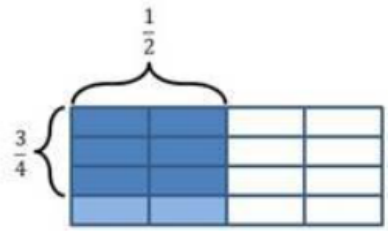
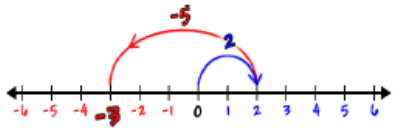
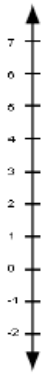
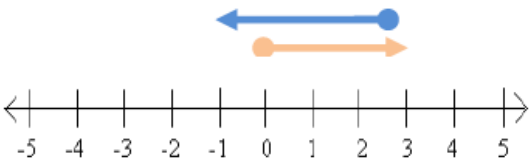
Often there is a misunderstanding that a percent is always a natural number less than or equal to 100. Provide examples of percent amounts that are greater than 100%, and percent amounts that are less than 1%.

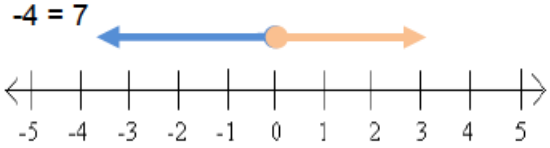
Students may not distinguish between proportional situations and additive situations. Students may not realize that although they may have added to find equivalent ratios, they did not add the same amount on both sides.

Students may still not understand the need to keep the same rate when thinking proportionally.

X. Teaching Multiple Representations

CONCRETE REPRESENTATIONS	
• Number Lines	
• 2-color coin counters to represent negatives and positives • Number Lines • Thermometers and other equally partitioned tools	 
PICTORIAL REPRESENTATIONS	
• Number Lines (Division Shown)	
• Rectangular Area Models (Division & Multiplication Shown)	

	$\frac{1}{2} \div \frac{1}{8}$  $\frac{3}{4} \times \frac{1}{2}$ 
• Number Lines (Horizontal) • Number Lines (Vertical)	 Figure 3 - Vertical Number Line 
• Distance / Vector Model	*Adding Integers* Addition is modeled as putting a second vector's tail at the first vector's head and finding where the second vector's head extends to. 3 + -4 = -1 

	Subtracting Integers Subtraction can be thought of as comparing the two vectors p, and q, by putting both tails together (starting each from zero) and asking the question: "How would one extend a vector from the head of p to the head of q?" The length and direction of that vector would be the result of the subtraction. 3 - -4 = 7 
ABSTRACT REPRESENTATIONS	
• Applying the Operations • Applying Properties of Numbers • Applying the standard algorithms for addition, subtraction, multiplication, and division	
• Applying Properties of Numbers	p – q = p + (-q) p - -q = p + q

XI. Assessment Framework

Unit 2 Assessment Framework				
Assessment	**NJSLS**	**Estimated Time**	**Format**	**Graded ?**
Chapter 4 Pretest (Beginning of Unit) *Math in Focus*	6.NS.1, 6.NS.2, 6.RP.1, 6.RP.3d	½ Block	Individual	Yes (No Weight)
Chapter 5 Pretest (After Chapter 4) *Math in Focus*	6.NS.1, 6.NS.2, 6.RP.1, 6.RP.3d	½ Block	Individual	Yes (No Weight)
Unit 2 Assessment 1 (After Chapter 5) *District Assessment*	6.RP.1, 6.RP.2,	1 Block	Individual	Yes
Chapter 6 Pretest (After Unit 2 Assessment 1) *Math in Focus*	6.RP.3, 6.RP.3c	½ Block	Individual	Yes (No Weight)
Unit 2 Assessment 2 (Conclusion of Unit) *District Assessment*	6.RP.A.3	1 Block	Individual	Yes
Chapter 4 Test (Optional) *Math in Focus*	6.NS.1, 6.NS.2, 6.RP.1, 6.RP.2, 6.RP.3, 6.RP.3b, 6.RP.3d	½ Block	Individual or Group	Yes, if administered
Chapter 5 Test (Optional) *Math in Focus*	6.NS.1, 6.NS.2, 6.RP.1, 6.RP.2, 6.RP.3, 6.RP.3b, 6.RP.3d	½ Block	Individual or Group	Yes, if administered
Chapter 6 Test (Optional) *Math in Focus*	6.RP.3, 6.RP.3c, 7.RP.3	½ Block	Individual or Group	Yes, if administered
Grade 6 Interim Assessment 2 (January) *District Assessment*	6.RP.1, 6.RP.2, 6.RP.3a, 6.RP.3b, 6.RP.3d	1 Block	Individual	Yes

Unit 2 Performance Assessment Framework				
Assessment	**NJSLS**	**Estimated Time**	**Format**	**Graded ?**
Unit 2 Performance Task 1 (Late November) *Games at Recess*	6.RP.A.1	1 Block	Individual	Yes; Rubric
Unit 2 Performance Task 2 (Mid-December) *Which detergent is a better buy?*	6.RP.A.3	1 Block	Individual	Yes; Rubric
Unit 2 Performance Task 3 (Mid-January) *Riding at a Constant Speed*	6.RP.A.2, 6.RP.A.3	1 Block	Individual	Yes; Rubric
Unit 2 Performance Task Option 1 (Optional) *Mixing Concrete*	6.RP.A.3	Teacher Discretion	Teacher Discretion	Yes, if administered
Unit 2 Performance Task Option 2 (Optional) *Ticket Booth*	6.RP.A.2, 6.RP.A.3a	Teacher Discretion	Teacher Discretion	Yes, if administered
Extended Constructed Response (ECR)* (click here for access)	Dependent on unit of study & month of administration	Up to 30 minutes	Individual	Yes; Rubric

* Use the following links to access ECR protocol and district assessment scoring documents:

- *Assessment & Data in Mathematics Bulletin*
- *Extended Constructed Response Protocol*

XII. Performance Tasks

Unit 2 Performance Task 1

Games at Recess (6.RP.A.1)

The students in Mr. Hill's class played games at recess.

6 boys played soccer
4 girls played soccer
2 boys jumped rope
8 girls jumped rope

Afterward, Mr. Hill asked the students to compare the boys and girls playing different games.

Mika said,
"Four more girls jumped rope than played soccer."

Chaska said,
"For every girl that played soccer, two girls jumped rope."

Mr. Hill said, "Mika compared the girls by looking at the difference and Chaska compared the girls using a ratio."

A. Compare the number of boys who played soccer and jumped rope using the difference. Write your answer as a sentence as Mika did.

B. Compare the number of boys who played soccer and jumped rope using a ratio. Write your answer as a sentence as Chaska did.

C. Compare the number of girls who played soccer to the number of boys who played soccer using a ratio. Write your answer as a sentence as Chaska did.

Solution

a. Four more boys played soccer than jumped rope.

b. For every three boys that played soccer, one boy jumped rope. Therefore the ratio of the number of boys that played soccer to the number of boys that jumped rope is 3:1 (or "three to one").

c. For every two girls that played soccer, three boys played soccer. Therefore the ratio of the number of girls that played soccer to the number of boys that played soccer is 2:3 (or "two to three").

Unit 2 Performance Task 1 PLD Rubric

SOLUTION

- A) Student indicates four more boys played soccer than jumped rope
- B) Student indicates for every three boys that played soccer, one boy jumped rope. Therefore the ratio of the number of boys that played soccer to the number of boys that jumped rope is 3:1 (or "three to one").
- C) Student indicates for every two girls that played soccer, three boys played soccer. Therefore the ratio of the number of girls that played soccer to the number of boys that played soccer is 2:3 (or "two to three"). .

Level 5: Distinguished Command	**Level 4: Strong Command**	**Level 3: Moderate Command**	**Level 2: Partial Command**	**Level 1: No Command**
Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and complete progression of steps • complete justification of a conclusion with minor computational error	Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and complete progression of steps • complete justification of a conclusionwith minor conceptual error	Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including: • a logical, but incomplete, progression of steps • minor calculation errors • partial justification of a conclusion	Constructs and communicates an incomplete response based on concrete referents provided in the prompt such as: diagrams, number line diagrams or coordinate plane diagrams, which may include: • a faulty approach based on a conjecture and/or stated assumptions • An illogical and incomplete progression of steps • major calculation errors • partial justification of a conclusion	The student shows no work or justification.

Unit 2 Performance Task 2

Which detergent is a better buy? (6.RP.A.3)

A store has two different brands of laundry detergent. Brand A can do 80 loads of laundry and costs $12.75. Brand B does 36 loads of laundry and costs $6.75. Which laundry detergent costs less per load? Show your work/ Explain your answer.

Solution

Solution: 1 Making a table

A table can be used to solve this problem in many different ways. For example we can use a table to find the cost to do 36 loads with Detergent A:

Washing with Detergent A

Loads of Wash	Cost
80	$12.75
40	$6.375
36	$5.6375

So detergent A is cheaper since it costs less than $6 to do 36 loads while detergent B costs $6.75 for 36 loads. This first approach with a table has the downside of running into complicated decimals that do not carry any meaning within the context of money, which is always rounded off to the nearest cent. A second method with a table that avoids this would be to look for a common multiple of 80 and 36. The least common multiple of these is 720. Then we can make two tables to find the cost with each detergent brand for 720 loads of wash:

Washing with Detergent A

Loads of Wash	Cost
80	$12.75
240	$38.25
720	$114.75

Washing with Detergent B

Loads of Wash	Cost
36	$6.75
72	$13.50
720	$135

We see again that detergent A costs less money per load than detergent B. In these tables, we could skip the middle line and go directly to the cost for 720 loads. An extra step was included because, particularly with the second table, each step (multiplying by 2 and then multiplying by 10) can be done mentally. For the first table, multiplying by 3 twice is probably easier to do mentally than multiplying by 9.

If the ratio

$$\text{loads of wash} : \text{cost of detergent}$$

is viewed as a fraction $\frac{\text{loads of wash}}{\text{cost of detergent}}$, the two methods outlined above correspond to comparing fractions by finding a common numerator and finding a common demoninator respectively.

Solution: 2 Finding a unit rate

We can calculate the approximate cost per load of wash with each detergent and then compare these numbers directly. With detergent A, we can wash 80 loads and the cost is $12.75. This means that the cost per load of wash with detergent A is

$\$12.75 \div 80 \approx \$0.16.$

The exact value is slightly less than $0.16 but closer to $0.16 than to $0.15. With detergent B we can wash 36 loads and the cost is $6.75. So the coast per load with detergent B is

$\$6.75 \div 36 = \$0.1875$

We can see that detergent A costs less per load of wash than detergent B, by almost 3 cents per load.

Solution: 3 Mental math

We can compare costs of the two detergents mentally. With detergent B we pay $6.75 for 36 loads. With two detergent B's we will pay 2 × $6.75 = $13.50 for 2 × 36 = 72 loads. This is more money for fewer loads of wash compared to detergent A: $0.75 cents more for 4 fewer loads of wash. Since detergent A does *more* loads of wash for *less* money it costs less per load of wash than detergent B.

Unit 2 Performance Task 2 PLD Rubric

SOLUTION

- A) Student indicates detergent A is the better buy. Student shows work to explain their answer.

Level 5: Distinguished Command	**Level 4: Strong Command**	**Level 3: Moderate Command**	**Level 2: Partial Command**	**Level 1: No Command**
Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and complete progression of steps • complete justification of a conclusionwith minor computational error	Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and complete progression of steps • complete justification of a conclusionwith minor conceptual error	Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including: • a logical, but incomplete, progression of steps • minor calculation errors • partial justification of a conclusion	Constructs and communicates an incomplete response based on concrete referents provided in the prompt such as: diagrams, number line diagrams or coordinate plane diagrams, which may include: • a faulty approach based on a conjecture and/or stated assumptions • An illogical and Incomplete progression of steps • major calculation errors • partial justification of a conclusion	The student shows no work or justification.

Unit 2 Performance Task 3

Riding at a Constant Speed (6.RP.A.2, 6.RP.A.3)

Lin rode a bike 20 miles in 150 minutes. If she rode at a constant speed,

A. How far did she ride in 15 minutes?

B. How long did it take her to ride 6 miles?

C. How fast did she ride in miles per hour? d. What was her pace in minutes per mile?

Solution

Solution 1

	A	B	C	D	E	F
Number of Minutes	150	15	7.5	30	45	60
Number of Miles	20	2	1	4	6	8

The values in column B were found by dividing both values in column A by 10. The values in column C were found by dividing both values in column B by 2. The other columns contain multiples of the values in column B.

a. If we look in column B, we can see that she could ride 2 miles in 15 minutes.
b. If we look in column E, we can see that it would take her 45 minutes to ride 6 miles.
c. If we look in column F, we can see that she is riding 8 miles every 60 minutes (which is 1 hour), so she is riding her bike at a rate of 8 miles per hour.
d. If we look in column C, we can see that her pace is 7.5 minutes per mile.

Solution 2

a. She could ride 1 mile in 7.5 minutes and 2 miles (1 + 1) in 15 minutes (7.5 + 7.5).
b. She rides 150/20 minutes per mile, which is 7.5 minutes per mile. So it would take her 45 minutes to ride 6 miles because $6 \times 7.5 = 45$.
c. If she rides 2 miles in 15 minutes, then she can ride 4 miles in 30 minutes and 8 miles per hour.
d. She rides 7.5 minutes per mile.

Unit 2 Performance Task 3 PLD Rubric

SOLUTION

- A) Student indicates she could ride 2 miles in 15 minutes.
- B) Student indicates it would take her 45 minutes to ride 6 miles.
- C) Student indicates she is riding her bike at a rate of 8 miles per hour.
- D) Student indicates that her pace is 7.5 minutes per mile.

Level 5: Distinguished Command	**Level 4: Strong Command**	**Level 3: Moderate Command**	**Level 2: Partial Command**	**Level 1: No Command**
Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and complete progression of steps • complete justification of a conclusionwith minor computational error	Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and complete progression of steps • complete justification of a conclusionwith minor conceptual error	Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including: • a logical, but incomplete, progression of steps • minor calculation errors • partial justification of a conclusion	Constructs and communicates an incomplete response based on concrete referents provided in the prompt such as: diagrams, number line diagrams or coordinate plane diagrams, which may include: • a faulty approach based on a conjecture and/or stated assumptions • An illogical and Incomplete progression of steps • major calculation errors • partial justification of a conclusion	The student shows no work or justification.

Unit 2 Performance Task Option 1

Mixing Concrete (6.RP.A.3)

A mixture of concrete is made up of sand and cement in a ratio of 5 : 3. How many cubic feet of each are needed to make 160 cubic feet of concrete mix?

Unit 2 Performance Task Option 2

Ticket Booth (6.RP.A.2, 6.RP.A.3a)

A school carnival ticket booth posts the following sign:

a. Which amount of tickets offers the best deal? Explain.

b. How would you suggest the students running the ticket booth modify the list of prices?

XIII. Modifications

Special Education/ 504:	English Language Learners:
-Adhere to all modifications and health concerns stated in each IEP. -Give students a MENU options, allowing students to pick assignments from different levels based on difficulty. -Accommodate Instructional Strategies: reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), handouts, definition list with visuals, extended time -Allow students to demonstrate understanding of a problem by drawing the picture of the answer and then explaining the reasoning orally and/or writing , such as Read-Draw-Write -Provide breaks between tasks, use positive reinforcement, use proximity -Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives -Implement supports for students with disabilities (click here) - Make use of strategies imbedded within lessons -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 17-18) - Strategies for students with 504 plans	- Use manipulatives to promote conceptual understanding and enhance vocabulary usage - Provide graphic representations, gestures, drawings, equations, realia, and pictures during all segments of instruction - During i-Ready lessons, click on “Español” to hear specific words in Spanish - Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information - Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve word problems - Utilize program translations (if available) for L1/ L2 students - Reword questions in simpler language - Make use of the ELL Mathematical Language Routines (click here for additional information) -Scaffolding instruction for ELL Learners -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 16-17)
Gifted and Talented:	**Students at Risk for Failure:**
- Elevated contextual complexity - Inquiry based or open ended assignments and projects - More time to study concepts with greater depth - Promote the synthesis of concepts and making real world connections - Provide students with enrichment practice that are imbedded in the curriculum such as: ● Application / Conceptual Development ● Are you ready for more? - Provide opportunities for math competitions - Alternative instruction pathways available - Common Core Approach to Differentiate Instruction: Students with Disabilities (pg. 20)	- Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum - Modify Instructional Strategies, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Peer Support - Constant parental/ guardian contact - Provide academic contracts to students & guardians - Create an interactive notebook with samples, key vocabulary words, student goals/ objectives. - Plan to address students at risk in your learning tasks, instructions, and directions. Anticipate where the needs will be, then address them prior to lessons. -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 19)

21st Century Life and Career Skills:

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.
https://www.state.nj.us/education/cccs/2014/career/9.pdf

- **CRP1**. Act as a responsible and contributing citizen and employee.
- **CRP2**. Apply appropriate academic and technical skills.
- **CRP3**. Attend to personal health and financial well-being.
- **CRP4**. Communicate clearly and effectively and with reason.
- **CRP5**. Consider the environmental, social and economic impacts of decisions.
- **CRP6**. Demonstrate creativity and innovation.
- **CRP7**. Employ valid and reliable research strategies.
- **CRP8**. Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9**. Model integrity, ethical leadership and effective management.
- **CRP10**. Plan education and career paths aligned to personal goals.
- **CRP11**. Use technology to enhance productivity.
- **CRP12**. Work productively in teams while using cultural global competence.

Students are given an opportunity to communicate with peers effectively, clearly, and with the use of technical language. They are encouraged to reason through experiences that promote critical thinking and emphasize the importance of perseverance. Students are exposed to various mediums of technology, such as digital learning, calculators, and educational websites.

Technology Standards:

All students will be prepared to meet the challenge of a dynamic global society in which they participate, contribute, achieve, and flourish through universal access to people, information, and ideas.
https://www.state.nj.us/education/cccs/2014/tech/

8.1 Educational Technology:

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

A. **Technology Operations and Concepts:** Students demonstrate a sound understanding of technology concepts, systems and operations.
B. **Creativity and Innovation:** Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
C. **Communication and Collaboration:** Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
D. **Digital Citizenship:** Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
E. **Research and Information Fluency:** Students apply digital tools to gather, evaluate, and use of information.
F. **Critical thinking, problem solving, and decision making:** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:

All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

A. **The Nature of Technology: Creativity and Innovation-** Technology systems impact every aspect of the world in which we live.
B. **Technology and Society:** Knowledge and understanding of human, cultural, and societal values are fundamental when designing technological systems and products in the global society.
C. **Design:** The design process is a systematic approach to solving problems.
D. **Abilities in a Technological World:** The designed world in a product of a design process that provides the means to convert resources into products and systems.
E. **Computational Thinking: Programming-** Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.

Interdisciplinary Connections:	
English Language Arts:	
L.6.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
SL.6.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
W.6.1	Write arguments to support claims with clear reasons and relevant evidence.

XIV. Core Instruction & Supplemental Resources

Core Instruction

MATH IN FOCUS v. 2015
(HOUGHTON MIFFLIN HARCOURT)

GRADE	TEACHER RESOURCES	STUDENT RESOURCES
2-5	• **Teacher Edition (A & B)** • Implementation Guide • Assessment Package • Enrichment Bundle • Extra Practice Guide • Transition Guides • Reteaching Guide • Home -to- School Connection Book • Online Teacher Technology Kit • Fact Fluency • Online Interactive Whiteboard Lessons	• Student Texts (A & B) • Student Workbooks • Online Student Technology Kit • Student Interactivities
6-7	• **Teacher Edition (A & B)** • Implementation Guide • Assessment Package • Enrichment Bundle • Extra Practice Guide • Transition Guides • Reteaching Guide • Home -to- School Connection Book • Online Teacher Technology Kit	• Student Texts (A & B) • Online Student Interactive Manipulatives

5 Practices for Orchestrating Productive Mathematics Discussions

Anticipate

Consider how students might mathematically interpret a problem, the array of strategies—both correct and incorrect—that they might use to tackle it, and how those strategies and interpretations might relate to the mathematical concepts, representations, procedures, and practices that you would like the students to learn.

- Solve the problem yourself first. If possible work with colleagues.
- Ask yourself the following questions:
  - What strategies have students used in the past?
  - What representations are students most likely to use?
  - What incorrect or unproductive strategies are students likely to try?
  - What things might get in the way of students being able to engage with the problem? How can you remove those barriers?
  - What questions will you ask those who struggle?

Monitor

Pay close attention to students' mathematical thinking and solution strategies as they work on the task.

- Create a list of strategies the students may produce.
- Circulate the room. Watch and listen to students as they work.
- If any students use strategies you anticipated, write their name or group number on your list.
- Ask questions that will help students make their thinking visible.
- Ask questions that will help students clarify their thinking.
- Press students to consider aspects of the task to which they need to attend.

Select

Select particular students to share their work with the rest of the class to get specific mathematics into the open for discussion. The selection of particular students and their solutions is guided by the previously anticipated strategies and your assessment of how each approach will contribute to that goal.

- Based on the previously anticipated strategies and the mathematical goal of the activity, decide which student strategies to highlight.
- Select students who will share their work with the class.

Sequence

Make purposeful choices about the order in which students' work is shared to maximize the chances of achieving the mathematical goals for the discussion.

- Based on the mathematical goal, decide on the purpose for the sequence of work. For example: least efficient to most efficient, concrete to abstract, misconceptions to conceptions, or building representations.
- Decide in which order students will present their work.

Connect

Help students draw connections between their solutions and other students' solutions as well as the key mathematical ideas in the lesson. Help students to make judgments about the consequences of different approaches for the range of problems that can be solved, one's likely accuracy and efficiency in solving them, and the kinds of mathematical patterns that can be most easily discerned. Know where you want the discussion to "land" and make choices that are likely to get you there. If necessary, you may have to demonstrate an approach that students didn't come up with themselves.

- As students share, ask questions to elicit and clarify student thinking.
- After each student shares, ask questions to connect it to previously shared work or ask a student to summarize what another student said in their own words.
- Ask students to compare and contrast strategies or representations during the discussion.
- If students did not come up with an approach that you need them to see in order for the discussion to "land," demonstrate this approach and connect it to the work that students did.

IDEAL MATH BLOCK

Whole Group Instruction	55min	INSTRUCTION (Grades 3 – 8) Daily Routine: Mathematical Content or Language Routine (7 – 10 min) Anchor Task: Anticipate, Monitor, Select, Sequence, Connect Tech Integration: Digital applets embedded within lessons designed to enhance student learning Collaborative Work* Guided Learning/Guided Practice Independent Work (Demonstration of Student Thinking) Additional Activities / Let's Practice		
Rotation Stations (Student Notebooks & Chromebooks Needed)	1-2X 30 min	STATION 1: Focus on current Grade Level Content STUDENT EXPLORATION* Independent or groups of 2-3 Emphasis on MP's 3, 6 (Reasoning and Precision) And MP's 1 & 4 (Problem Solving and Application) TOOLS/RESOURCES Practice Problems Extra Practice/Enrichment Are you ready for more? Put Your Thinking Cap On	STATION 2: Focus on Student Needs TECH STATION Independent TECH INTEGRATION iReady - *i-Ready* delivers online lessons driven by student data to provide tailored instruction that meets students where they are in their learning trajectory. Dreambox (ELL) – Adaptive online learning platform.	TEACHER STATION: Focus on Grade Level Content; heavily scaffolded to connect deficiencies TARGETED INSTRUCTION 4 – 5 Students TOOLS/ RESOURCES Homework Manipulatives Reteach Workbook Transition Guide *all students seen in 2 weeks
Closure	5 min	INSTRUCTION Exit Ticket (Demonstration of Student Thinking) TOOLS/RESOURCES Notebooks or Exit Ticket Slips		

* Promotes discourse and collaboration

Supplemental Resources

Achieve the Core

Tasks - https://achievethecore.org/category/416/mathematics-tasks

Coherence Map - https://achievethecore.org/page/1118/coherence-map

Embarc

https://embarc.online/

Engage NY

https://www.engageny.org/ccss-library/?f%5B0%5D=field_subject%253Aparents_all%3A13601

iReady Digital Platform

https://login.i-ready.com/

Math in Focus

https://my.hrw.com/

Illustrative Mathematics

Content Standard Tasks - https://tasks.illustrativemathematics.org/content-standards

Practice Standard Tasks - https://tasks.illustrativemathematics.org/practice-standards

Open Up Resources - https://access.openupresources.org/sign_in

iM Additional Resources - https://bit.ly/imshare

Khan Academy

https://www.khanacademy.org/math/illustrative-math

NJDOE Digital Item Library

https://nj.digitalitemlibrary.com/home?subject=Math

Ready Teacher Toolbox

https://teacher-toolbox.com/