7th Grade Mathematics

Unit #1: Becoming a 7th Grade Mathematician
Applying Proportional Reasoning to Represent and Solve Real World Problems
Pacing: 45 Days

Unit Overview

In this unit, students will build upon their work from 6th grade by learning to express different representations of rational numbers (fractions, decimals and percents) and will discover how to identify and explain the constant of proportionality. They will compute unit rates associated with ratios of fractions including ratios of lengths, areas and other quantities measured in like or different units, as well as create scale drawings of various geometric figures. Using computations, tables, and graphs, students will recognize and represent proportional relationships in order to solve real world problems involving simple interest, sales tax, mark-ups, discounts, gratuities and commission. This unit also provides ample time for students to practice until perfect their classroom rules, rituals, and routines, while also learning and applying the eight mathematical practices.
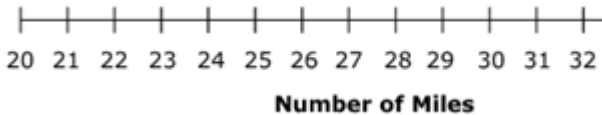
Prerequisite Skills	Vocabulary		Mathematical Practices
1) Graph on coordinate plane 2) Identify ratios 3) Find equivalent fractions by multiplying the numerator and denominator by the same number 4) Multiply and Divide within 100 with fluency 5) Understand what a percent is and how we use it in every day life 6) Know basic equivalencies between common fractions and percents 7) Calculate the perimeter and area of basic 2D figures	Fraction Equivalent Ratio Proportional Nonproportional Constant Rate of Change Constant of Variation Constant of Proportionality Direct Variation Unit Rate Unit Ratio Coordinate Plane Cross Product	Dimensional Analysis Ordered pair Origin Quadrants Rate Coordinates X-axis Y-axis Percent Discount Gratuity Percent Proportion Sales Tax	**MP.1:** Make sense of problems and persevere in solving them **MP.2:** Reason abstractly and quantitatively **MP.3:** Construct viable arguments and critique the reasoning of others **MP.4:** Model with mathematics **MP.5:** Use appropriate tools strategically **MP.6:** Attend to precision **MP.7:** Look for and make use of structure **MP.8:** Look for and express regularity in repeated reasoning

Common Core State Standards

| | Additional Standards → |
| | |

Additional Standards →

7.G.1: Scale Drawings

Major Standards →

7.RP.1: Compute Unit Rates
7.RP.A.2: Recognize and represent proportional relaitonships between quantities
7.RP.2a: Identify Proportional Relationships
7.RP.2b: Identify Unit Rate
7.RP.2c: Represent Proportional Relationshipos By Equations
7.RP.2d: Coordinate Points and Unit Rate
7.RP.3: Solve Multi-Step Ratio and Percent Problems

According to the PARCC Model Content Framework,
Standard 7.RP.2 should serve as opportunity for in-depth focus:
"Students in grade 7 grow in their ability to recognize, represent, and analyze proportional relationships in various ways, including by using tables, graphs, and equations."

The key advance in proportional reasoning between seventh and eighth grade is:
"Students build on previous work with proportional relationships, unit rates, and graphing to connect these ideas and understand that the points (x,y) on a non-vertical line are the solutions of the equation $y=mx+b$, where m is the slope of the line as well as the unit rate of a proportional relationship (in the case b=0). Students also formalize their previous work with linear relationships by working with functions—rules that assign to each input exactly one output."

Progression of Skills

6th Grade	7th Grade	8th Grade
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.	**7.RP.1: Compute unit rates** associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.	**8.EE.5:** Graph proportional relationships, interpreting the unit rate as the **slope** of the graph.
6.RP.1: Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.	**7.RP.2: Recognize and represent proportional relationships** between quantities.	**8.EE.5:** Graph proportional relationships, interpreting the unit rate as the slope of the graph. **Compare two different proportional relationships** represented in different ways.
6.RP.3c: Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	**7.RP.3:** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	**8.NS.1**: Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
N/A	**7.G.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.	N/A

Big Ideas	Students Will…	
	Know/Understand	**Be Skilled at…**
• Fractions, decimals and percents can be used interchangeably • Ratios use division to represent relationships between two quantities • The constant of proportionality is also considered to be the unit rate • How can I apply knowledge of ratios, proportions, rates, unit rates and functions in real-life scenarios? (i.e. using proportions to determine the best deal or to determine when things are fair, using scale factor to determine map distances, etc.)	• A **ratio** is a comparison of two numbers • A percent is another example of a ratio • A **proportion** is a statement showing that two ratios (fractions) are equal • Proportions are a comparison of two or more ratios and that their relationship is multiplicative • Proportional relationships express how quantities change in relationship to each other • In a statement with two equal fractions, the **cross product** is the numerator of the first fraction multiplied by the denominator of the second fraction and the numerator of the second fraction multiplied by the denominator of the first fraction • A **rate** is a comparison between two quantities with different units of measure • Rates and ratios can be used to describe patterns in ratio relationships and can be expressed in many forms (tables, graphs, words, and equations) • A **unit rate** is a rate that compares a quantity to one unit • Ratios and proportions can be utilized to solve for unknowns in real-life scenarios and can also be utilized to make predictions • A **function** is a relationship between values of one set of numbers to another set	• Determining estimations for ratios • Determining the proportionality of two or more ratios • Determining constant of proportionalities • Determining the unit rate of a rate • Comparing two rates graphically • Identifying the rule of a function • Constructing a model of a function on a graph • Evaluating the most appropriate measure of proportional reasoning to use when comparing and contrasting data (i.e., instead of presenting data as 65:21, presenting it as 3:1, or 3 x the number, in order to more accurately and precisely model data) • Converting fractions and decimals to percents • Calculating a given percentage of a number

		Unit Sequence		
	Student Friendly Objective SWBAT…	**Key Points/ Teaching Tips**	**Exit Ticket**	**Instructional Resources**
1	**Learn the expectations and practices of a 7th grade mathematician.**	I. **Classroom Rituals, Rules, and Procedures** • Class structure – 4 square DO NOW, Fluency Drills, Material Distribution, Organizing binders, notes, etc • Explain how the class vision relates to my personal goals; • Execute classroom procedures and explain their purpose II. **Pre-Assessments & Goal Setting** • Review previous year's data (strengths/weaknesses) • Fluency pre-assessment • Set individual and class goals III. **Getting to Know your Fellow Mathematicians** • Survey Class (Personality Types, Learning Modality, Interests, etc.) • Collect Data, Analyze and Display Data IV. **Writing and Speaking like a Mathematician** • Accountable talk protocols (Review: 6.NS.1, 6.NS.2) • Writing mathematical arguments (Review: 6.NS.4) V. **Investigating and Applying the 8 Mathematical Practices** • "The Power of Perseverance" (Review 6.NS.1, 6.NS.2 and 6.NS.4)		
2				
3				
4				
5				

6	Calculate unit rates based on ratios involving fractions using pictures, tables, and calculations.	**I.** Students should understand that a unit rate is a rate where the second term is one unit, e.g., $6.50/1 h, $3.99/1 doz. **II.** Practice recognizing familiar unit rates	1) Find each unit rate (round to the nearest hundredth if necessary): $5,027 for 128 hours of work = _____ $4.82 for 17 lbs = _____ 2) Suppose your pulse is 26 beats in 15 seconds. What is the unit rate per one minute? 3) To be considered a "fast talker," you should be able to clearly speak 350 words in 60 seconds. Sean can speak 60 words in 15 seconds. At this rate, is Sean a "fast talker"?	My Math Chapter 1 Lesson 1
7	Write ratios in simplest form to represent a real world situation and simplify complex fractions to determine the unit rate.		Justin's car can travel $77\frac{1}{2}$ miles with $3\frac{1}{10}$ gallons of gas. Kim's car can travel $99\frac{1}{5}$ miles with $3\frac{1}{5}$ gallons of gas. At these rates, find how far each car can travel on 1 gallon of gas. Show or explain how you found your answer. Then, draw and label points on the number line to show the number of miles each car can travel with one gallon of gas. 20 21 22 23 24 25 26 27 28 29 30 31 32 **Number of Miles**	My Math Chapter 1 Lesson 2

| #	Objective	Strategies	Assessment	Resources
8	Convert unit rates in order to express proportional relationships between lengths, areas and other quantities with different units	I. Discuss the difference between similar and congruent figures. II. Students should understand the relationships between similar sides and how to make a ratio with sides on each figure.	My Math Chapter 2 Lesson 3 Extra Practice (Page 31)	My Math Chapter 1 Lesson 3 Connected Math (Blue) Comparing and Scaling-Applications (Page 40)
9	Use real world ratios between fractions to calculate and explain the constant of proportionality (unit rate).	I. Engage students in their ability to recognize, represent, and analyze proportional relationships in various ways, including by using tables, graphs, and equations. For example, the number of people who live in an apartment building might be taken as proportional to the number of stories in the building for modeling purposes.	Molly runs $\frac{1}{3}$ of a mile in 4 minutes. (a) If Molly continues to run at the same speed, how long will it take her to run one mile? (b) Draw and label a picture showing why your answer to part (a) makes sense.	"Analyzing and Applying Unit Rate" (Appendix C) Connected Math (Blue) Comparing and Scaling-Applications (Page 40)
10	Determine if two quantities are in a proportional relationship by creating a table to find equivalent ratios and by graphing the quantities on a coordinate plane to determine if it is a straight line, etc. Identify the constant of proportionality (unit rate).	I. Recommendation: Review the coordinate plane by including it on the four square Do Now in the "I'm ready to tackle today's objective box"; a flat surface that is divided by two number lines into four quadrants and review the x-axis and y-axis II. Provide students with an opportunity to discover proportional relationships in small groups through discussions and observations	1) The table below gives the shipping price for different numbers of soccer balls. Do the numbers in the table represent a proportional relationship? Explain your answer. | Number of Balls	Price (In Dollars)
---	---
1	2
2	4
3	6
4	7	 2) A vine grows 7.5 feet every 5 days. Is the length of the vine on the last day proportional to the number of days of growth? Explain	My Math Chapter 1 Lesson 4 *Modify resource to completely meet objective by requiring students to graph points on coordinate plane* Connected Math (Blue) Investigation (Page 49) https://learnzillion.com/lessons/1865

| 11 | Explore relationships between variables on the coordinate plane.

Graph proportional relationships on the coordinate plane. | I. | Engage students in their ability to recognize, represent, and analyze proportional relationships in various ways, including by using tables, graphs, and equations. For example, the number of people who live in an apartment building might be taken as proportional to the number of stories in the building for modeling purposes. | The graphs below represent different how four different students travelled from their lockers to their class.
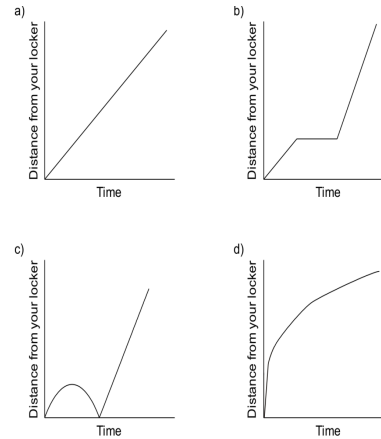
Three of the following stories correspond to the graphs. Match the graphs and the stories. Then, write a story to represent the fourth graph.

1. I started to walk to class, but I realized I had forgotten my notebook, so I went back to my locker and then I went quickly at a constant rate to class.
2. I was rushing to get to class when I realized I wasn't really late, so I slowed down a bit.
3. I started walking at a steady, slow, constant rate to my class, and then a teacher stopped me and asked me for a pass. Realizing I was going to be late, I ran the rest of the way at a steady, faster rate.
4. Write a story to describe the 4th graph | My Math Chapter 1 Lesson 5 |

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12	Investigate to determine how proportional and non-proportional linear relationships are alike or different	I. It is important to expose students to questions that seem proportional, but are not. Students need to practice recognizing when a multiplicative relationship exists. II. Direct proportional reasoning occurs when any two given variables maintain a constant ratio. III. An inverse proportional relationship occurs when one variable increases if the other decreases. II.	Describe a real-world situation that represents a proportional relationship. Then explain how you could change your situation so that it represents a non-proportional relationship.	My Math Chapter 1 Inquiry Lab Pages 53-54 "Proportion and Non-Proportion Situations" (Appendix C)
13	Analyze graphs in order to describe the proportional relationship between two measures in a real world context			https://learnzillion.com/lessons/3022-describe-the-relationship-between-measures-by-examining-a-graph https://learnzillion.com/lessons/3196-answer-questions-about-a-proportional-relationship-using-a-graph
14	**Flex Day (Instruction Based on Data)** **Recommended Resources:** "Party Planning" (Appendix C) "Apple Pie Bake Sale" (Appendix C) "Cooking with the Whole Cup" (Appendix C)			

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15	Solve proportional relationships in real world contexts using calculations. **(2 days)**	I.	Students may use a content web site and/or interactive white board to create tables and graphs of proportional or non-proportional relationships. Graphing proportional relationships represented in a table helps students recognize that the graph is a line through the origin (0,0) with a constant of proportionality equal to the slope of the line.	There are 4 girls for every 5 boys in Maurice's school. How many students are in his school if there are 228 girls in his school?	My Math Chapter 1 Lesson 6 Connected Math (Blue) Comparing and Scaling- Investigation (Page 49) http://www.purplemath.com/modules/ratio4.htm
16					
17	Use proportional relationships in tables and graphs to calculate the rate of change.	I.	Students may use a content web site and/or interactive white board to create tables and graphs of proportional or non-proportional relationships. Graphing proportional relationships represented in a table helps students recognize that the graph is a line through the origin (0,0) with a constant of proportionality equal to the slope of the line.	Kevin's savings account balance changed from $1140 in January to $1450 in April. Find the average rate of change per month. Round your answer to the nearest dollar.	My Math Chapter 1 Lesson 7 Connected Math (Blue) Comparing and Scaling, Lesson 3.2 http://www.algebra-class.com/rate-of-change.html

18	Understand that the constant of proportionality is the unit rate and can identify it between quantities using tables, graphs, equations, diagrams, and verbal descriptions.	I.	Be sure to clarify student confusion about independent and dependent variables with the activity students complete.	Amy and her family were traveling during their vacation. She looked at her watch at Point 1 in the diagram below, and then again at Point 2 in the diagram below. Her mom told her how far they traveled in that time, as noted below.	My Math Chapter 1 Lessons 8-9
19	(2 days)	II.	Discuss with students what is meant by "ratio" and how is that different from "unit rate" (constant of proportionality).		**https://learnzillion.com/lessons/3219** http://learnzillion.com/lessons/1872 http://learnzillion.com/lessons/1870 http://learnzillion.com/lessons/1873 http://learnzillion.com/lessons/1812

|------------80 miles-----------|

Point 1   Point 2

   a. Based on this information, what is the unit rate of the car? Explain in writing what that unit rate means in the context of the problem.

   b. Amy's dad said that the entire trip was 1200 miles. How many hours will it take to complete the trip? Explain how you know.

20	Students understand and determine if two quantities are in a proportional relationship including but not limited to: creating a table to find equivalent ratios, graphing the quantities on a coordinate plane to determine if it is a straight line, etc. **(2 days)**	Using a graphical representation of equivalent fractions to develop student thinking about proportionality and a constant rate of change (slope) makes a good transition from rational numbers to proportionality.	1) Photographs come in several standard print sizes. Some of the most common print sizes are 4x6, 5x7, and 8x10. (Note: The dimensions are given in inches.) Does a proportional relationship exist between these print sizes? Justify your answer.	"Mandarin Orange Cake Task" (Appendix C) "Popping Corn" (Appendix C) http://www.virtualnerd.com/middle-math/ratios-proportions-percent/ratios-rates/equivalent-ratios-table-example http://www.virtualnerd.com/common-core/grade-7/7_RP-ratios-proportional-relationships/A/2/2a
21				
22	**Flex Day (Instruction Based on Data)** **Recommended Resources:** My Math 21st Century Career in Engineering (Pages 89 – 90) My Math Chapter 1 Review (Pages 91 – 94) "Feeding Frenzy" (Appendix C) "How Fast do they Grow?" (Appendix C)			

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| 23 | Compute the proportional relationship between points on a graph. **(2 days)** | • Students think that just because a relationship between variables increases or decreases by the same value, it is proportional. They need to know that that is not true. The graph of the relationship must pass through the origin as well as change by a constant amount. Thus, using an example like miles per gallon is a good way to illustrate this concept, because when gallons is 0 (the independent variable is zero) then the number of miles is also zero (0). Also, this is a good time to promote the habit of checking in a table to see if y/x (the slope of the values in the table) is always the same number, therefore the ratios are the same and the relationship is proportional. | Carli's class built some solar-powered robots. They raced the robots in the parking lot at school. The graphs below are line segments that show the distance d, in meters, that each of three robots traveled after t seconds.
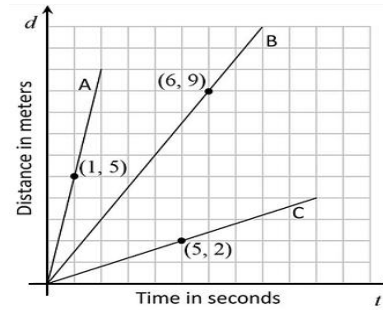
(a) Each line segment has a point labeled. What does each point tell you about how far that robot has traveled?
(b) Carli said that the ratio between the number of seconds each robot travels and the number of meters it has traveled is constant. Is she correct? Explain.
(c) How fast is each robot traveling? How did you compute this from the graph? | "Graphing Proportional Relationships Lesson" (Appendix C)

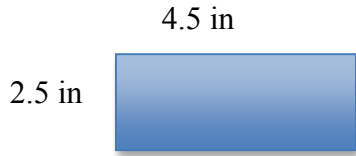"Graphs of Proportional Relationships" (Appendix C)

PARCC Task (Appendix C) |
| 24 | | | | |

| 25 | Write linear equations to represent proportional relationships expressed in various ways. (**2 days**) | • Make it clear to students that an equation is similar to a balance scale. You are given two quantities which are in balance. In order to solve the equation, you need to keep the equation balanced by doing the exact same thing to both sides of the equation.
• Remind students to read the problem carefully and figure out what it is asking you to find, then assign a variable to the missing quantity. Remind students to write down what the variable represents and then re-read the problem before attempting to write the equation. | The students in Ms. Baca's art class were mixing yellow and blue paint. She told them that two mixtures will be the same shade of green if the blue and yellow paint are in the same ratio. The table below shows the different mixtures of paint that the students made.

a. How many different shades of paint did the students make?
b. Write an equation that relates y, the number of parts of yellow paint, and b, the number of parts of blue paint for each of the different shades of paint the students made. | "Pancake Breakfast" (Appendix C)

http://learnzillion.com/lessonsets/325-represent-proportional-relationships-by-equations

http://learnzillion.com/lessons/1537

http://learnzillion.com/lessons/1533 |
| 26 | | | | |

	A	B	C	D	E	F
Yellow	1 part	2 parts	3 parts	4 parts	5 parts	6 pa
Blue	2 part	3 parts	6 parts	6 parts	8 parts	9 pa

| 27 | Explain and solve real world problems by identifying the constant of proportionality of a proportional relationship and applying it within the context of the situation. | • Be sure to clarify student confusion about independent and dependent variables with the activity students complete.
• Discuss with students what is meant by "ratio" and how is that different from "unit rate" (constant of proportionality). | The distance to the beach at Little Boar's Head is 10 miles. If you were to walk at a steady 4 mph, how much time would be needed for the trip? If you were to ride your bike at 8 miles per hour, how much time would be needed for the trip? Express the relationship between the speed and the time in an equation. At what rate (miles per hour) must you travel if you want to make this trip in 1 hour? In one minute? In one second? | "Let's Bounce" (Appendix C)

Connected Math (Blue) Comparing and Scaling, Lesson 4.3 |

| 28 | **Flex Day (Instruction Based on Data)**
Recommended Resources:
"Nate and Natalie's Walk" (Appendix C)
"Buses" (Appendix C) |

29	Convert between fractions, decimals and percents.
	
	Represent percentages using bar models.
		• This lesson provides an opportunity to meet the specific needs of your students in building their prerequisite skills for the remainder of the unit. In order to be successful in subsequent lessons students must:
		  o Have a strong, conceptual understanding of what a percent is ("per 100")
		  o Convert between fractions, decimals and percents
		• Remind students that a percent is a ratio of a number to 100. A percent tells what part of 100 is being considered.
				My Math
				"Am I Ready?" (Pg 98)
				Inquiry Lab (99-102)
				
				https://learnzillion.com/lessons/3556-estimate-a-percent-value-using-a-bar-model
				
				https://learnzillion.com/lessons/3447-solve-ratio-and-percent-problems-using-bar-models

30	Find the percent of a number by multiplying in both fraction and decimal form.	• In these types of problems the percentage and the whole are known and the part is the unknown. Having students do many exercises of the type "Find 40% of 230" allows them to become skilled in finding a percent of a number before applying those skills to problem solving.	The human body is made up of mostly water. In fact, about 67% of a person's total (100%) body weight is water. If Mark weighs 90 pounds, about how much of his weight is water?	My Math Chapter 2 Lesson 1
31	Use estimation in percent problems to evaluate reasonableness of their answers.	• Estimating with percents can be done in the same way as estimating decimals. Numbers are rounded in order to make computation easier. Sometimes percents can be estimated mentally. • Sometimes estimating with percents is more easily done by using fractions. As students gain experience and confidence in converting between percents, decimals, and fractions, they may find this method easier. Encourage students to refer to common benchmarks (1/4, ½, ¾ when estimating percentages)	Estimate: 123% of 50: _____ 53% of 470: _____	My Math Chapter 2 Lesson 2

32	Translate real-world problems into proportions involving percent.	• Sometimes the hardest part of a word problem is figuring out how to turn the words into an equation you can solve; so be sure to focus on student understanding of the language in the word problems.	192 students were surveyed about their favorite kind of TV programs. The results are shown in the table. Which kind of program did 25% of the students report as their favorite?	My Math Chapter 2 Lesson 3 https://learnzillion.com/lessons/3505-solve-ratio-and-percent-problems-using-a-proportion https://learnzillion.com/lessons/3611-solve-percent-of-a-number-problems-using-a-proportion-model

Favorite TV Programs

Kind	Number
Music	48
Reality	44
Comedy	41
Sports	36
Drama	23

33	Use the percent equation to find unknowns in percent problems.	• Remind students that a percent is a ratio of a number to 100. A percent tells what part of 100 is being considered. To solve percent problems, either proportions or equations can be used. Students should know how to solve proportions and equations. If n is the percent, x is the part, and w is the whole, students can write and solve a		My Math Chapter 2 Lesson 4 https://learnzillion.com/lessons/3547-solve-for-an-unknown-percentage

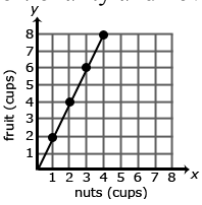| 34 | Calculate percent change. Find either the original amount, the final amount or the percent change. | • A student might say: "The original cost of a gallon of gas is $4.17. An increase of 100% means that the cost will double. I will also need to add another 24% to figure out the final projected cost of a gallon of gas. Since 25% of $4.17 is about $1.04, the projected cost of a gallon of gas should be around $9.40."
• For percent increase and decrease, students identify the starting value, determine the difference, and compare the difference in the two values to the starting value. | There were 24 boys and 20 girls in a chess club last year. This year the number of boys increased by 25% but the number of girls decreased by 10%. Was there an increase or decrease in overall membership? Find the overall percent change in membership of the club. Show or explain your work. | My Math Chapter 2 Lesson 5

"Increasing and Decreasing Quantities by a Percent" (Appendix C)

https://learnzillion.com/lessons/880-find-the-amount-of-change-and-the-final-amount-given-the-percent-of-change-and-the-original-amount

https://learnzillion.com/lessons/881-find-the-percent-of-change-and-what-percent-the-final-amount-is-of-the-original-amount

https://learnzillion.com/lessons/882-find-the-original-amount-and-the-amount-of-change-given-the-percent-change-and-final-amount |
| 35 | | | | |

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36	Apply sales tax, tips, and markup procedures to solve problems.		Tom wants to buy some protein bars and magazines for a trip. He has decided to buy three times as many protein bars as magazines. Each protein bar costs $0.70 and each magazine costs $2.50. The sales tax rate on both items is 612%. How many of each item can he buy if he has $20.00 to spend? Show your work or explain your answer.	My Math Chapter 2 Lesson 6 https://learnzillion.com/lessons/3507-apply-taxes-tips-and-discounts-using-a-proportion-and-scale-factor http://mathvids.com/lesson/mathhelp/987-sales-tax-and-commission
37	Apply discounts or markdowns to solve problems.		You want a laptop computer. At Kaitlin's Computer Store, the laptop is $900 on sale for 15% off. The same laptop is $1,000 at Turner's Technology. But you have a coupon for 20% off. Which laptop do you buy?	My Math Chapter 2 Lesson 7 "25% Sale" (Appendix C) http://www.mathplayground.com/mathatthemall2.html
38	Apply the procedures for finding simple interest to solve problems.	• Explain that if you are borrowing money, you pay interest, but if you are lending money through a savings account or other investment, you earn interest. • Explain that the interest rate is the percent of the money owed that the borrower pays the lender each year. Explain that you can convert a percentage to a decimal by dividing it by 100.	Sam charged $75 at an interest rate of 12.5%. How much will Sam have to pay after one month if he makes no payments?	My Math Chapter 2 Lesson 8 http://mathvids.com/lesson/mathhelp/989-simple-interest http://www.teachertube.com/viewVideo.php?title=Simple_Interest&video_id=8321

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39	Flex Days (Instruction Based on Data)
	Recommended Resources:
	"Which is the Better Deal?" (Appendix C)
	"Developing a Sense of Scale" (Appendix C)
	"Patterns and Percents" (Appendix C)

40	Compare scale drawings with their original image.	• understand that a scale drawing is either the reduction or the enlargement of a two-dimensional picture.	Engage NY Exit Ticket	"Engage NY Lesson 16" (Appendix C)
41	Understand and solve problems using multiplicative reasoning with proportion and computing scaled lengths and areas.	• In a scale drawing, the scale is the ratio of the measurements in the drawing of an object to the corresponding measurements of the actual object. • By using proportions, students can find lengths needed to make a scale drawing or can find the actual lengths of an object based on a given scale drawing.	1) If the scale on a map is ½ inch = 5 miles, and a school and a house on the map are 12 inches apart on the map, how far apart are they in real life? 2) Below is a scale drawing of a chalkboard in a 5th grade classroom 4.5 in 2.5 in **Scale: 1 inch = 2 feet** What are the actual dimensions?	"Engage NY Lesson 17" (Appendix C) My Math Chapter 7 Problem Solving Investigation (Pg 567) http://www.virtualnerd.com/middle-math/ratios-proportions-percent/scale-drawings-models/proportion-word-problem-example
42	Given a scale drawing, identify the scale factor in order to make intuitive comparisons of size then compute actual lengths/dimensions.		A particular map shows a scale of 1 cm : 5 km. What would the map distance (in cm) be if the actual distance is 14 km? Construct the map distance as a line.	"Engage NY Lesson 18" (Appendix C)

43	Reproduce a scale drawing at a different scale.			"Engage NY Lesson 21" (Appendix C) My Math Chapter 7 Inquiry Lab (Page 571) My Math Chapter 7 Lesson 4 http://www.basic-mathematics.com/scale-drawings.html
44	**Flex Days (Instruction Based on Data)** ***Recommended Resources:*** "Ice Cream" (Appendix C) "Creating a Scale Map" (Appendix C) "Engage NY Lesson 20" (Appendix C) My Math 21st Century Career in Video Game Design (Pages 177 – 178) My Math Chapter 2 Review (Pages 179 – 182) My Math Unit 1 Project (Pages 183 – 184)			
45	**MCLASS Beacon End of Unit Assessment** ***Appendix B*** ** Note: This assessment will be administered online**			

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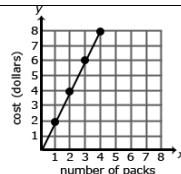# Appendix A:
Unpacked Standards Guide
Source: Public Schools of North Carolina NCDPI Collaborative Workspace

Standard	Unpacking *What do these standards mean a child will know and be able to do?*
7.RP.1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks ½ mile in each ¼ hour, compute the unit rate as the complex fraction ½ to ¼ miles per hour, equivalently 2 miles per hour.*	**7.RP.1** For example, if a person walks ½ mile in each ¼ hour, compute the unit rate as the complex fraction ½ to ¼ miles per hour, equivalently
7.RP.2. 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. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.* d. Explain what a point *(x, y)* on the graph	**7.RP.2.** Students may use a content web site and/or interactive white board to create tables and graphs of proportional or non-proportional relationships. Graphing proportional relationships represented in a table helps students recognize that the graph is a line through the origin (0,0) with a constant of proportionality equal to the slope of the line. Examples: • A student is making trail mix. Create a graph to determine if the quantities of nuts and fruit are proportional for each serving size listed in the table. If the quantities are proportional, what is the constant of proportionality or unit rate that defines the relationship? Explain how you determined the constant of proportionality and how it relates to both the table and graph. | Serving Size	1	2	3	4
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Cups of Nuts (x)	1	2	3	4
Cups of Fruit (y)	2	4	6	8	 The relationship is proportional. For each of the other serving sizes there are 2 cups of fruit for every 1 cup of nuts (2:1). The constant of proportionality is shown in the first column of the table and by the slope of the line on the graph. • The graph below represents the cost of gum packs as a unit rate of $2 dollars for every pack of gum. The unit rate is represented as $2/pack. Represent the relationship using a table and an equation.

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Table:

Number of Packs of Gum (*g*)	Cost in Dollars (*d*)
0	0
1	2
2	4
3	6
4	8

Equation: $d = 2g$, where d is the cost in dollars and g is the packs of gum

A common error is to reverse the position of the variables when writing equations. Students may find it useful to use variables specifically related to the quantities rather than using x and y. Constructing verbal models can also be helpful. A student might describe the situation as "the number of packs of gum times the cost for each pack is the total cost in dollars". They can use this verbal model to construct the equation. Students can check their equation by substituting values and comparing their results to the table. The checking process helps student revise and recheck their model as necessary. The number of packs of gum times the cost for each pack is the total cost

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

7.RP.3. Students should be able to explain or show their work using a representation (numbers, words, pictures, physical objects, or equations) and verify that their answer is reasonable. Models help students to identify the parts of the problem and how the values are related. For percent increase and decrease, students identify the starting value, determine the difference, and compare the difference in the two values to the starting value.

Examples:

• Gas prices are projected to increase 124% by April 2015. A gallon of gas currently costs $4.17. What is the projected cost of a gallon of gas for April 2015?

A student might say: "The original cost of a gallon of gas is $4.17. An increase of 100% means that the cost will double. I will also need to add another 24% to figure out the final projected cost of a gallon of gas. Since 25% of $4.17 is about $1.04, the projected cost of a gallon of gas should be around $9.40."

$4.17 + 4.17 + (0.24 \cdot 4.17) = 2.24 \times 4.17$

100%	100%	24%
$4.17	$4.17	?

• A sweater is marked down 33%. Its original price was $37.50. What is the price of the sweater before sales tax?

$37.50	
Original Price of Sweater	
33% of $37.50	67% of $37.50

The discount is 33% times 37.50. The sale price of the sweater is the original price minus the discount or 67% of the original price of the sweater, or Sale Price = 0.67 x Original Price.

A shirt is on sale for 40% off. The sale price is $12. What was the original price? What was the amount of the discount?

Discount	Sale Price - $12
40% of original price	60% of original price
Original Price (p)	

$0.60n = 12$

• At a certain store, 48 television sets were sold in April. The manager at the store wants to encourage the sales team to sell more TVs and is going to give all the sales team members a bonus if the number of TVs sold increases by 30% in May. How many TVs must the sales team sell in May to receive the bonus? Justify your solution.

• A salesperson set a goal to earn $2,000 in May. He receives a base salary of $500 as well as a 10% commission for all sales. How much merchandise will he have to sell to meet his goal?

After eating at a restaurant, your bill before tax is $52.60 The sales tax rate is 8%. You decide to leave a 20% tip for the waiter based on the pre-tax amount. How much is the tip you leave for the waiter? How much will the total bill be, including tax and tip? Express your solution as a multiple of the bill. The amount paid = 0.20 x $52.50 + 0.08 x $52.50 = 0.28 x $52.50

7.G.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.	• Julie showed you the scale drawing of her room. If each 2 cm on the scale drawing equals 5 ft, what are the actual dimensions of Julie's room? Reproduce the drawing at 3 times its current size.

5.6 cm

1.2 cm

4 cm

1.2 cm

2.8 cm

4.4 cm