

MATHEMATICS COMMON CORE CURRICULUM UNIT#5 Grade 6*

North Smithfield School Department

TITLE OF UNIT: Ratio and Proportions

GRADE : 6

DATE PRESENTED: _____ **DATE DUE:** _____ **LENGTH OF TIME:** Several weeks, quarter, semester

OVERVIEW OF UNIT:

In this unit, students will understand and apply the concepts of rate and ratio. They will use unit rates, find percents of quantities, and make tables of equivalent ratios in solving real-world problems. They will analyze the relationships between dependent and independent variables using graphs and tables.

ESSENTIAL QUESTIONS

What is the difference between a fraction and a ratio?

How can unit rates be used to solve real-world problems?

How does a table, graph, or equation determine the relationship between a dependent and independent variable?

STANDARDS: Common Core Math Standards – Grade level domains 6-8

Ratios and Proportional Relationships RP	The Number System NS	Expressions and Equations EE	Functions (grade 8) F	Geometry G	Statistics and Probability SP
6.RP.1, 2, 3		6.EE.9			
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STANDARDS: Mathematical Practices grades K-12

- | | | | | | | | |
|---|---|--|-----------------------------|--|------------------------|---------------------------------------|--|
| 1. Make sense of problems and persevere in solving them | 2. Reason abstractly and quantitatively | 3. Construct viable arguments and critique the reasoning of others | 4. Model with mathematics ★ | 5. Use appropriate tools strategically | 6. Attend to precision | 7. Look for and make use of structure | 8. Look for and express regularity in repeated reasoning |
|---|---|--|-----------------------------|--|------------------------|---------------------------------------|--|

FOCUS MATHEMATICS STANDARDS:

- Understand ratio concepts and use ratio reasoning to solve problems. **6.RP.1, 2, 3**
- Represent and analyze quantitative relationships between dependent and independent variables. **6.EE.9**

Applied Learning Standards:

problem solving
communication
critical thinking
research
reflection/ evaluation

Expectations for Student Learning (High School only):

ENDURING UNDERSTANDING:

- Students will be able to explain how a fraction is different from a ratio.
- Students will determine the unit rate and apply it to a real-world situation.
- Students will create tables, graphs, and equations to represent quantitative relationships between dependent and independent variables.

PRIOR KNOWLEDGE:

STUDENT OBJECTIVES, SKILLS and/or NEW KNOWLEDGE:

- 6.RP.1** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
- 6.RP.2** Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.
- 6.RP.3** 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.

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- a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. **6.RP.3a**
- b. Solve unit rate problems including those involving unit pricing and constant speed.
 - o *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?* **6.RP.3b**
- c. 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. **6.RP.3c**
- d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. **6.RP.3d**

6.EE.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

SUGGESTED PROBLEMS:

6.RP.1 Basic

- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/076/original/illustrative_mathematics_76.pdf?1343857006

6.RP.1 Advanced

- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/001/181/original/illustrative_mathematics_1181.pdf?136381578

6.RP.2 Basic

- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/549/original/illustrative_mathematics_549.pdf?1343857011

6.RP.2 Advanced

- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/001/175/original/illustrative_mathematics_1175.pdf?1363815755

6.RP.3 Advanced

- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/135/original/illustrative_mathematics_135.pdf?1343856950
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/135/original/illustrative_mathematics_135.pdf?1343856950

6.EE.9 Basic

- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/806/original/illustrative_mathematics_806.pdf?1344434399

ACTIVITIES, PRODUCTS, PERFORMANCE, and ASSESSMENTS: see curriculum introduction

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|---------------------------------------|----------------------------|--|---|
| 1. Application to real world problems | 6. Graphic organizers | 14. Problem/Performance based/common tasks | 18. Technology |
| 2. Creating charts/collecting data | 7. Graphing | 15. Real-life applications involving graphing | 19. Summarizing and note-taking |
| 3. Collaboration - interpersonal | 8. Interviews | 16. Represent numbers | 20. Tests and quizzes |
| 4. Conferencing | 9. Journals | 17. Rubrics/checklists (mathematical practice, modeling) | 21. Writing genres Arguments/ opinion Informative |
| 5. Exhibits | 10. KWL charts | | |
| | 11. Mathematical Practices | | |
| | 12. Modeling ★ | | |
| | 13. Oral presentations | | |

6.RP.1

- o Model different ratios (i.e. using two-colored counters or draw pictures)

6.RP.2

- o Solve real-world problems using their knowledge of unit rate.

6.RP.3

- o Solve real-world problems and mathematical problems using visual models, graphs, and tables.
- o Solve problems using the percent of a quantity. (See last example in 6.RP.3 in Teaching Examples on Curriculum Map)

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- **6.EE.9**
 - Graph linear equations to show the change in “y” in relation to “x”.
 - Translate among words, mathematical phrases, models, tables, graphs, and equations.
 - Create a real- world mathematical situation that is represented by a given set of data/graph.

UNIT 5 ASSESSMENT

HIGHER ORDER THINKING SKILLS: Web’s Depth of Knowledge 2 – 4 or Bloom’s Taxonomy

Web’s Depth of Knowledge

- skill/conceptual understanding
- strategic reasoning
- extended reasoning

Bloom’s Taxonomy

- apply
- analyze
- synthesize/create
- evaluate

ADDITIONAL RESOURCES: see curriculum for specifics

- *Exploration in Core Math , Holt Mc Dougal*
- *Holt Grade 6 Mathematics*

VOCABULARY

6.RP.1

- Fraction
- Denominator
- Numerator
- Quantity
- Rate
- Ratio

6.RP.2

- Unit rate

6.RP.3

- Equivalent rate
- Proportion
- Cross product property
- Percent

6.EE.9

- Constant
- Dependent variable
- Independent variable
- Function
- Graph
- Linear equation
- Table

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LESSON PLAN for UNIT _____

LESSONS

- Lesson # 1** Summary:

- Lesson #2** Summary:

- Lesson #3** Summary:

OBJECTIVES for LESSON # _____

- Materials/Resources:**

- Procedures:**
 - **Lead -in**

 - **Step by step**

 - **Closure**

- Instructional strategies:** see curriculum introduction

- Assessments:** see curriculum introduction
 - **Formative**

 - **Summative**