Unit 6: Ratios, Proportions, Percentages
Algebra Prep
9 Class Meetings – Revised June 2016

Essential Questions

- How can ratios and rates be used to relate and compare numbers?
- What kinds of relationships can proportions represent?
- How can solving percentages be applied to real world situations?

Enduring Understandings with Unit Goals

EU #1: Ratios and rates compare two numbers using division.
  - Write and simplify ratios using the three different forms.
  - Compare rates by calculating the unit rate.

EU #2: A proportion is an equation that states that two ratios are equal.
  - Derive and solve proportions using real world information.

EU #3: A percent is a ratio out of one hundred.
  - Create proportions to solve percentage problems in the real world.

Standards

Common Core State Standards/College and Career Readiness Anchor Standards :

- CCSS.MATH.CONTENT.7.RP.A.1
  Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction $^{1/2}/_{1/4}$ miles per hour, equivalently 2 miles per hour*.

- CCSS.MATH.CONTENT.7.RP.A.2
  Recognize and represent proportional relationships between quantities.

- CCSS.MATH.CONTENT.7.RP.A.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.

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MSMHS 21st Century Learning Expectations

Competency 1: Read and write effectively for a variety of purposes.
Competency 3: Make decisions and solve problems independently and collaboratively.
Competency 5: Contribute to a positive learning environment with respect and responsibility.

Unit Content Overview

1. **Ratios/Unit Rates**
   - Writing and reducing ratios
   - Comparing unit rates

2. **Proportions**
   - Solving proportions
   - Using proportions to solve problems

3. **Percentages**
   - Using proportions to find percentages
   - Finding a part and a base
   - Using proportions to solve real world percentage problems

Learning Objectives

Students will be able to…

- Compare numbers using ratios
- Write rates as fractions and find unit rates
- Compare unit rates to determine which is a better buy
- Convert rates and ratios into simplest form
- Find an unknown value in a proportion
- Utilize proportions to solve real world problems
- Use proportions to solve percentage problems
- Analyze percent problems to identify the given information and the unknown quantity

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Assured Learning Experiences

Instructional Strategies/Differentiation
- Daily Warm Up Activities
- Power Point Lecture with note-taking
- Guided Notes
- Flexible grouping
- Exit slips
- Graphic Organizers
- Creating authentic connections for students
- Rephrasing and restatement of information and concepts
- Accountable Talk Discussion
- Independent Problem Solving
- Collaborative Problem Solving
- Pizza Recipe Performance Task (practical application)
  - Rubric 3: Problem Solving
- Homework

Interdisciplinary Connections
- Language Arts- Accountable Talk, Word Problems

Assessments

FORMATIVE ASSESSMENTS:

- Warm ups (SAT prep)
- ABCD Cards
- Whiteboards
- Mid-class check-ins
- Exit Slips
- Student-led instruction
- Homework
- Pizza Recipe Performance Task
  - Rubric 3: Problem Solving

SUMMATIVE ASSESSMENTS:

- Quiz on EU #1 and #2
- Unit Test
- Pizza Recipe Performance Task

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Unit Task

Unit Task Name: Pizza Recipe

Description: Students will use information learned in this unit about how ratios and rates are used to compare quantities (EU #1) in order to create a recipe for a pizza they will propose to the school cafeteria as a new menu item. Students will use unit rates to calculate the unit price for each of their chosen ingredients. They will then use the unit price to determine how much the cafeteria would have to spend to buy the ingredients to make enough pizza for 12 students and enough pizza for 240 students.   They will write a proposal to convince the cafeteria manager to use their recipe. The proposal will include a description of all of the mathematics used to determine the prices as well as a convincing argument as to why the cafeteria should choose their pizza as a new menu item.

Evaluation: Rubric 3: Problem Solving

Unit Resources

- Textbook (Prentice Hall Mathematics: Pre Algebra, By Randall Charles, Bonnie McNemar, Alma Ramirez. Pearson Education, Inc. 2009)
- MSMHS School-wide Rubrics
- Internet databases
- Laptops