South Amherst Middle School Grade 7 Mathematics

Unit 1:Ratios& Proportional Relationships

Time: Approximate time frame 6-8 weeks

Standard(s):

Analyze proportional relationships and use them to solve real-world and mathematical problems

- 7.RP.1 Compute unit rates associates with rations 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 $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.*
- 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 of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.
- 7. RP.3 Use proportional relationships to solve multi-step ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

Big Ideas: *Students will understand that …*

- Rates, ratios, percentages and proportional relationships express how quantities change in relationship to each other.
- Rates, ratios, percentages and proportional relationships can be represented in multiple ways.
- Rates, ratios, percentages and proportional relationships can be applied to problem solving situations.
- Rates, ratios, percentages and proportional relationships can be applied to problem solving situations such as interest, tax, discount, etc.
- Rates, ratios, percentages and proportional relationships can be applied to solve multi-step ratio and percent problems.

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Essential Questions:

- How do rates, ratios, percentages and proportional relationships apply to our world?
- When and why do I use proportional comparisons?
- How does comparing quantities describe the relationship between them?
- How do graphs illustrate proportional relationships?
- How can I use proportional relationships to solve ratio and percent problems?

Prerequisite Skills:

Students should already be able to:

- Understand ratio concepts and use ratio reasoning to solve problems. (6.RP 1-3)
- Compute unit rates associated with rations of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. (7.RP.1)
- Recognize and represent proportional relationships between quantities. (7.RP.2)

Skills: Students will be able to …

- *Compute unit rates involving rational numbers, fractions, and complex fractions. (7.RP.1)*
- *Compute ratios of length in like or different units. (7.RP.1)*
- *Compute ratios of area and other measurements in like or different units. (7.RP.1)*
- *Determine whether two quantities are in a proportional relationship by using a table and or graph. (7.RP.2)*
- *Identify the constant of proportionality (unit rate) in tables, graphs, diagrams, and verbal descriptions. (7.RP.2)*
- *Create and solve equations to represent proportional relationships. (7.RP.2)*

Unit 1:Ratios& Proportional Relationships

- *Use words to describe the location of a point on a graph and its relationship to the origin. (7.RP.2)*
- *Explain what a point on a graph of a proportional relationship means in terms of the situation. (how does the one quantity relate to the other) (7.RP.2)*
- *Solve multi-step ratio and percent problems. (7.RP.3)*
- *Solve problems involving simple interest and tax. (7.RP.3)*
- *Solve problems involving markups and markdowns, gratuities and commissions,and fees. (7.RP.3)*
- *Solve problems involving percent increase, percent decrease, and percent (marginof) error. (7.RP.3)*

Vocabulary:

Simple Interest, Percent increase,Percentdecrease,Commission,Percenterror,Rate of change,Gratuity,Tax ,Tip ,Ratio ,Rate ,Proportion, Percent ,Unit rate ,Equivalency ,Greatest Common,Factor (GCF) ,Least Common Multiple (LCM), Percent increase, Percent decrease, Percent error, Markdowns, Markups, Scale, Tax, Gratuity, Simple interest,

Resources:

Textbook, ODE, Online Programs, Collaboration with Colleagues

Assessments:

- **Formative:** Exit cards, bell ringers, homework practice, observations, in-class practice, student self-reflection.
- **Summative:** Assessments, Quizzes, Projects.