Unit # 4 : Ratios, Proportions, and Percent

Content Area: **Mathematics**
Course(s):
Time Period: **December**
Length: **16 days**
Status: **Published**

Unit Overview

Writing ratios in simplest form is introduced in the beginning of this unit. From there, the connection between ratios and unit prices is established. How to write a proportion and decide if two fractions are proportional is then developed. Towards the end of the unit, solving proportions is presented with applications.

Enduring Understandings

- A fraction is also considered a ratio.
- A unit rate(price) is essentially a ratio.
- Two equal fractions are called a proportion
- Unit prices are used to compare the cost of two items.

Essential Questions

- How are ratios used to establish unit rates ?
- How can you determine whether two fractions are proportional ?
- How do you solve a proportion ?
- How do you use unit prices to compare the cost of two items ?
- What are the different ways to write a ratio ?
- What is a proportion ?

Standards / Indicators / Student learning Objectives (SLOs) :

- SWBAT determine whether two fractions are proportional
- SWBAT determine whether two rates are proportional
- SWBAT fnd a unit price
- SWBAT interpret and compare rates

- SWBAT solve a proportion for an unknown value
- SWBAT solve an application involving a proportion
- SWBAT use unit prices to compare the cost of two items
- SWBAT write a proportion
- SWBAT write a ratio as a unit rate
- SWBAT write the ratio of two quantities in simplest form

MA.6.RP.A	Understand ratio concepts and use ratio reasoning to solve problems.
MA.K-12.2	Reason abstractly and quantitatively.
MA.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.
MA.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.
MA.6.RP.A.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.
MA.7.RP.A.2a	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.
MA.6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.
MA.K-12.8	Look for and express regularity in repeated reasoning. Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Lesson Titles/Objectives

- Proportions
- Rates and unit pricing
- Ratios
- Solving proportions

Career Readiness, Life Literacies & Key Skills

WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.

Inter-Disciplinary Connections

LA.RH.11-12.4	Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines faction in Federalist No. 10).
LA.WHST.11-12.2.E	Provide a concluding paragraph or section that supports the argument presented.
SCI.HS-LS4-3	Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

Instructional Strategies, Learning Activities, and Blooms/DOK:

- Applications with proportions
- Explanation , examples, and practice determining whether two fractions are proprotional.
- Explanation , examples, and practice with comparing unit rates.
- Explanation , examples, and practice with finding unit prices and using them to compare the cost of two items.
- Explanation , examples, and practice with solving a proportion.
- Explanation , examples, and practice with writing a rate as a unit rate
- Explanation , examples, and practice with writing a ratio of two quantities
- Explanation , examples, and practice with writing proportions
- Tutoring during Delsea One

Modifications

ELL Modifications

- Assess ELL students continuously using formative assessment methods
- Alternate assessment options….physical demonstration.
- Be flexible with time frames and deadlines
- Repeat, reword, clarify

IEP and 504 Modifications

- Allowing student to correct mistakes or answer wrong questions correctly for additional credit if failed the first test (another way to re-teach material)
- Allowing student to take notes in class for reinforcement but also providing a copy of completed/correct notes to study from
- Math tests could have formula's available on the test and/or sample problems
- Providing study guides that don't lead the student to study too much extraneous information (less unnecessary details)/scaffolded study guides
- Rewording questions so that there are not higher level vocabulary within the question

G & T Modifications

- Additional reinforcement activities soliciting a deeper understanding of curriculum.
- Different test items.
- Generating and testing hypotheses
- Specific career they are interested in? How would this apply to their interest?)

At Risk Modifications

- Hands-on Instruction
- Modeling and showing lots of examples
- Study guides
- Additional help during tutoring/Delsea One/Academic Enrichment
- Guided notes
- Review, restate, reword directions
- Tutoring during Delsea One
- Visuals

Formative Assessment

- Accuplacer practice problem
- Begin the homework assignment and periodically check answers together
- Class discussions
- Graded classwork
- Graded homework
- Guided practice
- Individual practice
- Oral questioning
- Oral response

- Teacher observation
- Warm up - "Check Yourself" problems on determining whether 2 fractions are proportional
- Warm up - "Check Yourself" problems on determining whether 2 rates are proportional
- Warm up - "Check Yourself" problems on finding unit prices
- Warm up - "Check Yourself" problems on interpreting and comparing unit rates
- Warm up - "Check Yourself" problems on solving a proportion for an unknown value
- Warm up - "Check Yourself" problems on solving applications involving proportions
- Warm up - "Check Yourself" problems on using unit price to compare the cost of 2 items
- Warm up - "Check Yourself" problems on writing a ratio of 2 quantities in simplest form
- Warm up - "Check Yourself" problems on writing proportions
- Warm up - "Check Yourself" problems on writing rates as unit rates
- Written work

Summative Assessment

- Accuplacer practice test
- Accuplacer Test
- Quiz on Ratios, Rates and Unit Pricing, and Proportions (sections 5 - 1 through 5 - 3)
- Unit Test on Ratios and Proportions

Resources & Materials

- Internet Sources: http://accuplacer.collegeboard.org/students
- Internet worksheets (see formative assessment section for specific topics)
- Smart Board
- Teacher made worksheets (see formative assessment section for specific topics)
- Text: Basic Mathematical Skills with Geometry (2008)

Technology

- Chrome book

- http://search.tb.ask.com/search/video.jhtml?n=780b84c6&p2=%5EHJ%5Exdm003%5ES08332%5Eus&pg=video&pn=1&ptb=1C82398E-A539-4113-88A7-65D0896B1033&qs=&searchfor=videos+on+unit+price&si=COXgjabZvbwCFUcV7AodPS4ALw&ss=sub&st=kwd&tpr=sbt&vidOrd=3&vidId=j7CWX8pkuso
- http://www.consumerreports.org/video/view/money/shopping/1630773192001/unit-pricing-helps-you-save/
- https://www.khanacademy.org/math/pre-algebra/pre-algebra-ratios-rates/pre-algebra-rates/v/finding-unit-prices
- https://www.youtube.com/watch?v=KMe85qahPbk
- Internet Sources: http://accuplacer.collegeboard.org/students
- Math XL
- Smart Board

TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.D.CS2	Demonstrate personal responsibility for lifelong learning.