Unit 2: Introducing Ratios

Content Area: **Mathematics**
Course(s): **Math - Grade 6**
Time Period: **October**
Length: **19 days**
Status: **Published**

Unit Overview

In this unit, students learn to understand and use the terms “ratio,” “rate,” “equivalent ratios,” “per,” “at this rate,” “constant speed,” and “constant rate,” and to recognize when two ratios are or are not equivalent. They represent ratios as expressions, and represent equivalent ratios with double number line diagrams, tape diagrams, and tables.

Transfer

Students will be able to independently use their learning to solve real-world situations including:

- ratios
- representing equivalent ratios
- solving ratio problems

Meaning

Understandings

Students will understand:

- how to use tables and graphs to find and solve for ratios.

Essential Questions

How can you use mathematics to describe change and model real-world situations?

Application of Knowledge and Skill

Students will know...

- the vocabulary accompanying the unit.
- multiple ways to represent ratios.

Students will be skilled at...

- writing ratios and proportions
- solving for equivalent ratios.
- comparing and ordering ratios.
- solving real world problems dealing with ratios, including percents.

Learning Goal

Understand ratio concepts and use ratio reasoning to solve problems

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.4	Model with mathematics.
MA.K-12.6	Attend to precision.

Vocabulary

ratio, equivalent ratio, double number line diagram, per, unit price, meters per second, same rate, table, tape diagram

Daily Target- Lesson 1

- Comprehend the word “ratio” (in written and spoken language) and the notation a:b (in written language) to refer to an association between quantities.
- Describe (orally and in writing) associations between quantities using the language “For every a of these, there are b of those” and “The ratio of these to those is a:b (or a to b).”

Desmos Ratios https://teacher.desmos.com/activitybuilder/custom/58d825423d490920a3dee617

Desmos Visual Ratios https://teacher.desmos.com/activitybuilder/custom/5f0492020330ed0ef082f162

MA.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Daily Target- Lesson 2

- Coordinate discrete diagrams and multiple written sentences describing the same ratios.
- Draw and label discrete diagrams to represent situations involving ratios.
- Practice reading and writing sentences describing ratios, e.g., “The ratio of these to those is a:b. The ratio of these to those is a to b. For every a of these, there are b of those.”

MA.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Daily Target- Lesson 3

- Draw and label a discrete diagram with circled groups to represent multiple batches of a recipe.
- Explain equivalent ratios (orally and in writing) in terms of different sized batches of the same recipe having the same taste.
- Understand that doubling or tripling a recipe involves multiplying the amount of each ingredient by the same number, yielding something that tastes the same.

Ratio Rumble https://mathsnacks.com/ratio-rumble.html

Desmos Ratio Rumble
Review: https://teacher.desmos.com/activitybuilder/custom/5bb208420cf43e0d09f8095a

MA.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Daily Target- Lesson 4

- Comprehend and respond (orally and in writing) to questions asking whether two ratios are equivalent, in the context of color mixtures.
- Draw and label a discrete diagram with circled groups to represent multiple batches of a color mixture.
- Explain equivalent ratios (orally and in writing) in terms of the amounts of each color in a mixture being multiplied by the same number to create another mixture that is the same shade

Desmos Blue Paint (color

recipe) https://teacher.desmos.com/activitybuilder/custom/5b8ed4acf427230c6ed04352

MA.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Daily Target- Lesson 5

- Generate equivalent ratios and justify that they are equivalent.
- Present (in words and through other representations) a definition of equivalent ratios, including examples and non-examples.

Desmos Equivalent Ratios https://teacher.desmos.com/activitybuilder/custom/5f05277c20ab90443a51155e

MA.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Daily Target- Lesson 6

- Compare and contrast (orally and in writing) discrete diagrams and double number line diagrams representing the same situation.
- Explain (orally) how to use a double number line diagram to find equivalent ratios.
- Label and interpret a double number line diagram that represents a familiar context.

Desmos Ratios Tape
Diagrams https://teacher.desmos.com/activitybuilder/custom/5f052e3b20ab90443a5115ac

MA.6.RP.A.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.

Daily Target- Lesson 7

- Comprehend and use the word "per" (orally and in writing) to mean "for each."
- Draw and label a double number line diagram from scratch, with parallel lines and equally-spaced tick marks.
- Use double number line diagrams to find a wider range of equivalent ratios.

Explore ratios with double number lines in this Learnzillion activity https://learnzillion.com/lesson_plans/175-use-ratio-reasoning-on-double-number-lines-to-generate-equivalent-ratios-and-solve-ratio-problems/?card=47518

MA.6.RP.A.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.

Daily Target- Lesson 8

- Calculate equivalent ratios between prices and quantities and present the solution method (using words and other representations).
- Calculate unit price and express it using the word "per" (orally and in writing).
- Understand the phrase "at this rate" indicates that equivalent ratios are involved.

Desmos Click Battle to explore unit rate https://teacher.desmos.com/activitybuilder/custom/59233ca25ebd6c10d1af9c05

MA.6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.

Daily Target- Lesson 9

- Calculate the distance an object travels in 1 unit of time and express it using a phrase like "meters per second" (orally and in writing).
- For an object moving at a constant speed, use a double number line diagram to represent equivalent ratios between the distance traveled and elapsed time.
- Justify (orally and in writing) which of two objects is moving faster, by identifying that it travels more distance in the same amount of time or that it travels the same distance in less time.

Desmos Constant Rate https://teacher.desmos.com/activitybuilder/custom/56266e04a463e7ea075a3d5a

MA.6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.

Daily Target- Lesson 10

- Choose and create diagrams to help compare two situations and explain whether they happen at the same rate.
- Justify that two situations do not happen at the same rate by finding a ratio to describe each situation where the two ratios share one value but not the other, i.e., a:b and a:c, or x:z and y:z.
- Recognize that a question asking whether two situations happen "at the same rate" is asking whether the ratios are equivalent.

Desmos Sugar Sugar https://teacher.desmos.com/activitybuilder/custom/56d766ebf260b18c09188aa5

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.6.RP.A.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.
MA.6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.

Daily Target- Lesson 11

- Comprehend the words "row" and "column" (in written and spoken language) as they are used to describe a table of equivalent ratios.
- Explain (orally and in writing) how to find a missing value in a table of equivalent ratios.

- Interpret a table of equivalent ratios that represents different sized batches of a recipe.

Desmos Ratio Tables Intro https://teacher.desmos.com/activitybuilder/custom/5f0534dbf37c7e55386e401b

MA.6.RP.A.3a	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.

Daily Target- Lesson 12

- Choose multipliers strategically while solving multi-step problems involving equivalent ratios.
- Describe (orally and in writing) how a table of equivalent ratios was used to solve a problem about prices and quantities.
- Remember that dividing by a whole number is the same as multiplying by an associated unit fraction.

Desmos -challange some students with ratio tables and thinking about graphing ratios
https://teacher.desmos.com/activitybuilder/custom/56be6a214a30a80c0f4bdbb6

MA.6.RP.A.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.
MA.6.RP.A.3a	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.

Daily Target- Lesson 13

- Compare and contrast (orally) double number line diagrams and tables representing the same situation.
- Draw and label a table of equivalent ratios from scratch to solve problems about constant speed.

MA.6.RP.A.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.
MA.6.RP.A.3a	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.

Daily Target- Lesson 14

- Determine what information is needed to solve a problem involving equivalent ratios. Ask questions to elicit that information.
- Understand the structure of a what-why info gap activity.

MA.6.RP.A.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.

Daily Target- Lesson 15

- Comprehend the word “parts” as an unspecified unit in sentences (written and spoken) describing ratios.
- Draw and label a tape diagram to solve problems involving ratios and the total amount. Explain (orally) the solution method.

MA.6.RP.A.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.

Daily Target- Lesson 16

- Choose and create diagrams to help solve problems involving ratios and the total amount.
- Compare and contrast (orally) different representations of and solution methods for the same problem.

MA.6.RP.A.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.

Daily Target- Lesson 17

- Apply reasoning developed throughout this unit to an unfamiliar problem.
- Decide what information is needed to solve a real-world problem.
- Make simplifying assumptions about a real-world situation.

Desmos Fermi Problem https://teacher.desmos.com/activitybuilder/custom/5f05e81108a14359b71ac808

MA.6.RP.A	Understand ratio concepts and use ratio reasoning to solve problems.
MA.6.RP.A.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.

Formative Assessment and Performance Opportunities

- Academic Game
- BrainPop
- Centers
- Class Discussions
- Clickers
- Desmos Activities

- Do Now
- Exit Ticket
- Graphic Organizer
- LinkIT
- Project
- Quiz
- Self-Assessment
- Student Teacher
- Teacher Interview
- Teacher Observation
- Think, Pair, Share

Summative Assessment

Group Presentation

End of Unit Assessment (located in google drive)

Chapter Project

21st Century Life and Careers

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP6.1	Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
CAEP.9.2.8.B.6	Demonstrate understanding of the necessary preparation and legal requirements to enter the workforce.
TECH.8.1.8.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.8.B.CS2	Create original works as a means of personal or group expression.
TECH.8.1.8.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.8.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.

Accommodations and Modifications

- *Executive Functioning: Visual Aids.* Create an anchor chart (e.g., definition and visual for ratio as described in the lesson) publicly displaying important definitions, rules, formulas or concepts for future reference.
- *Memory: Processing Time.* Provide sticky notes or mini whiteboards to aid students with working memory challenges.
- *Visual-Spatial Processing: Visual Aids.* Provide handouts of the representations for students to draw on or highlight.
- *Conceptual Processing: Manipulatives.* Provide manipulatives (e.g., snap cubes) to aid students who benefit from hands-on activities.
- Teacher will modify test for student(s)
- Students may use graph paper to help organize data
- A word bank can be provided
- Leveled centers can be used
- Small group instruction can be utilized
- Calculators may be used
- Extra Practice Board can be utilized to review pre-requisite skills
- Interactive games/websites may be used to practice skills
- Teacher can conference with student(s) to "check-in"
- Uitilize items in the room to demonstrate skills as they relate to their life (eg; price per pound)

- Calculators
- Compass Learning
- Extra Practice Board
- Interactive Games/Websites
- Leveled Centers
- Manipulatives
- Modify Assessments
- Provide Notes
- Teacher Conferences
- Word Bank

Unit Resources

Mr. Morgan's Math Help https://sites.google.com/view/mrmorgansmathhelp/illustrative-mathematics/math-6/unit-1-area-and-surface-area

Unit 2 6th Grade Shared drive

End of the Unit Kahoot Review https://create.kahoot.it/share/f49fe2c6-e470-4379-b4da-e5c574b04d6d

End of Unit Jeopardy Game http://www.superteachertools.us/jeopardyx/jeopardy-review-game.php?gamefile=2518914&fbclid=IwAR36E__9Vuf0Cu0RtfIvYyQuEE4-D6fRjYacASSyP8bbfgxKGceSnE8UX2s#.XwS4kmhKg2w

Lesson 8 Kahoot https://create.kahoot.it/share/fbd016ae-4691-4ea6-bb1a-6fcb5d4bf30a

Check out these 3-Act Math activities for Unit 2 (after lesson 6 or 7)

http://www.101qs.com/2841-nanas-paint-mixup

http://www.101qs.com/202-nanas-chocolate-milk

Illustrative Math YouTube Channel https://www.youtube.com/c/ChannelGRated/videos

Interdisciplinary Connections

Unit 2:

Lesson 3 Family and Consumer Science - Discuss recipies and how they are adapted to fit different size

families and dietary needs

Visual and Performing Arts Lesson 4 Color mixtures of paint needed for different colors.

Business - Lesson 8 How Much For One - Discuss better buy for budget needs.

Science/Physics - Lesson 9 Constant Speed