# Ratio and Proportion

**Level:** B (GLE 5-8, CCRS C/ D)  
**Anticipated Length of Time:** 27 hours (3 hrs/ week for 9 weeks)

## Stage 1 - Desired Results

**Goal/ Learner Outcomes:**

By the end of this unit, students will be able to **use an understanding of ratios in order to correctly mix medication.**

**CCR Content Standard(s):**

- Understand ratio concepts and use ratio reasoning to solve problems (6.RP.1, 6.RP.2, 6.RP.3)
- Analyze proportional relationships and use them to solve real-world and mathematical problems (7.RP.2)
- Gain familiarity with factors and multiples (4.OA.4)

**CCR Standard(s) for Mathematical Practice:**

MP 1 (Make sense and persevere)  
MP 2 (Reason abstractly and quantitatively)  
MP 4 (Modeling)  
MP 8 (Look for and express regularity in repeated reasoning)

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<tr>
<th>Understanding(s)</th>
<th>Essential Question(s) (Big ideas)</th>
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| Students will understand… (concepts) | What does it mean to have equal ratios?  
How do I know if they are equal? |
| Ratios involve multiplicative relationships | How is a ratio a comparison? |
| Where equal ratios are important in the real world | How are ratios similar or different from fractions? |
| How to tell if two ratios are equal | |
| The difference between part/part and part/whole relationships | |

| Student Knowledge and Skills | |
|-----------------------------| |
| Students will know … (skills) | |
| How to set up a ratio and proportion | |
| Different ways write ratios using notation and words | |
| How to use pictures, the property of equal ratios, unit cost/rate, or the cross product to tell if two ratios are equal | |
| Solve for a missing quantity in a proportion | |
Students will be able to … (application)

- Compare two deals
- Keep two recipes “correct” while adjusting the quantities involved
- Fix a recipe
- Choose from several possible ways of expressing a ratio to find the most effective way to make a point

Other Integrated Math Content

- Benchmarks: ½, ¼, ¾, 1/10 as fractions, decimals, and percentages
- Number sense: Division and multiplication as inverse operations
- Number sense: Common multiples
- Test Strategies: Using a Process of Elimination
- Test Strategies: Drawing a picture

Stage 2 - Assessment Evidence

Performance Task(s):

- Students will design an advertisement to “make a point”
- Students will correctly mix a “medicine” according to instructions and fix an improperly mixed recipe

Other Evidence:

- Open-notebook Quiz
- HiSet-like questions
- Informal assessment

Stage 3 - Learning Plan

Learning Activities

**EMPower Keeping Things in Proportion (KP) Lesson 1 – A Close Look at Supermarket Ads**

- Students use supermarket ads to find ratios and determine prices for different quantities
- Students look for patterns in the numbers and generalize. Students discuss and solidify methods for determining equal ratios.
- Students create ads for buying a product in bulk and compare different bulk deals.

**EMPower (KP) Lesson 3 – Tasty Ratios**

- Students use taste and sight to estimate ratios for 3 orange juice mixtures.
- Students use pictures to determine how to fix failed recipes.

Teacher generated

- Student write part/part and part/whole ratios about the class and about posters
- Students take notes about different ways to write ratios using notation and words
**EMPower (KP) Lesson 4 – Another Way to Say It**
- Students write part/part and part/whole ratios about the orange juice recipe.
- Students analyze two truths and a lie about a complex ratio situation
- Students apply different ways of writing comparisons to advertisements and discuss which are most effective.
- Students explore the connection between part/whole ratios and fractions and percentages.

**Test Strategies (use questions from pg 55-56 in EMPower KP)**
- Students take notes on using a process of elimination and on questions that use “not” and practice these strategies with test practice problems involving ratios

**EMPower (KP) Lesson 8 – Playing with the Numbers**
- Students look closely at the relationships between the numbers in a proportion (in and among)
- Students determine if statements about proportions are true.
- Students review the relationship between multiplication and division.
- Students use the cross product to solve for a missing number in a proportion.

**Teacher generated**
- Students mix “medicines” (using water and Kool-Aid) following instructions.
- Students fix failed medicine mixtures.