NH Adult Education Lesson Plan

Denise Reddington Dover Adult Learning Center

**Ratio and Proportion Lemonade Plus**

**NH Mathematics Guidebook Standards:**

- Develop understanding of ratios and proportional relationships (pages 59 & 60) (1a.)
- Write ratios (1b.)
- Write equivalent ratios (1d.)
- Set up a proportion to fit a situation (1 c.)
- Use proportion to solve a problem (2 b.)

**Introduction and/or Review**

- Watch *Cooking with Ratios*, a 5-minute video found on [www.tv411](http://www.tv411)
- Review the terminology and basics of Ratio and Proportion using the attached Notebook Foldable. Use one section or all 3 depending on the needs of the individual or group.

**Lesson Activity**

- Pass out a Classic Lemonade Recipe worksheet to each student. Have the visual manipulative lemons and cups available on the table. Both are attached.
- Have students work in groups of 2 or individually to complete the exercise. Once everyone is done, correct and discuss together.
- Pass out a Classic Lemonade Ratio and Proportion worksheet to each student (attached).
- Have students work in groups of 2 or individually to complete the exercise. Once everyone is done, correct and discuss together.

**Evaluate**

- Take a break and evaluate how students are performing and responding to the lesson. What do they find easy? What seems most difficult? Are some struggling or showing frustration? Have they had enough ratio and proportion for one day?

**Next Lesson Follow Up, Review, and Development of Skills**

- Use the **Sugar Free Baby Cait** recipes, manipulatives, and questions based on the needs of individual students and the group. The **Sweetest** recipe is an easier review while the **Less Sweet** recipe is more challenging because it incorporates fractions. All the attached worksheets can be mixed and matched for use in a multi-level classroom. They could also be used for homework or review.
• www.tv411 has interactive on-line activities that can be used in class or at home. There are also worksheets, recipes, and readings available.

• Use the Illustrated Mathematics website to find more ratio and proportion lessons. Baking Bread 1 and Breaking Bread 2 would be an excellent supplement or review for these standards.

• Kim Hanson’s Proportion Packet 2013 NH Mini-grant project is an excellent resource.
A ratio is a comparison of two or more numbers.

Example:

🌟🌟〇〇〇

The ratio of stars to circles is 2 to 3.

YOU SHOULD KNOW:

There are 3 ways to write a ratio:
1) \( \frac{2}{3} \)
2) \( \frac{3}{2} \)
3) 2 to 3

A \underline{unit} rate tells the rate in lowest terms, or the amount for 1.

Ex. \( \frac{100 \text{ miles}}{2 \text{ hours}} = \frac{50 \text{ miles}}{1 \text{ hour}} \)

A rate is a \underline{ratio} comparing two numbers with different \underline{units}.

Example:

A car travels 100 miles in 2 hours.

\[
\frac{100 \text{ miles}}{2 \text{ hours}} = \frac{50 \text{ miles}}{1 \text{ hour}}
\]

A proportion is an \underline{equation} showing two ratios are \underline{equal}.

Example:

\[
\frac{10}{25} = \frac{40}{100}
\]

YOU SHOULD KNOW:

In a proportion, if the ratios are equivalent, then the \underline{cross products} are equal. Think of equal fractions.
Classic Lemonade

- 8 lemons juiced
- 10 cups of water
- 2 cups of sugar

Directions

1. In a small saucepan, combine sugar and one cup of water. Bring to a boil and stir to dissolve sugar. Allow to cool at room temperature, then cover and refrigerate until chilled.
2. Remove seeds from lemon juice, but leave pulp. In a pitcher, stir together chilled syrup, lemon juice and remaining 9 cups of water.

This recipe makes 12 8-ounce servings. Each serving has 130 calories.

1. If you **double** this recipe, how many lemons will you need? ________
   How many cups of water? ____________ Cups of sugar? ____________

2. If you double this recipe, how many 8 ounce servings will you have?

3. If you **triple** this recipe, how many lemons will you need? ________
   How many cups of water? ____________ Cups of sugar? ____________

4. If you triple this recipe, how many servings will you be able to provide? __________

5. How many lemons, cups of water, and cups of sugar will you need if you cut this recipe in **half**? ____________________________

6. How many servings can you provide if you cut this recipe in **half**?
Classic Lemonade

- 8 lemons juiced
- 10 cups of water
- 2 cups of sugar

Directions

1. In a small saucepan, combine sugar and one cup of water. Bring to a boil and stir to dissolve sugar. Allow to cool at room temperature, then cover and refrigerate until chilled.
2. Remove seeds from lemon juice, but leave pulp. In a pitcher, stir together chilled syrup, lemon juice and remaining 9 cups of water.

This recipe makes 12 8-ounce servings. Each serving has 130 calories.

1. If you double this recipe, how many lemons will you need? 16
   How many cups of water? 20   Cups of sugar? 4

2. If you double this recipe, how many 8 ounce servings will you have? 24

3. If you triple this recipe, how many lemons will you need? 24
   How many cups of water? 30   Cups of sugar? 6

4. If you triple this recipe, how many servings will you be able to provide? 36

5. How many lemons, cups of water, and cups of sugar will you need if you cut this recipe in half? 4 lemons, 5 cups of water, 1 cup of sugar

6. How many servings can you provide if you cut this recipe in half? 6
Classic Lemonade Ratio and Proportion

8 lemons juiced     10 cups of water        2 cups of sugar
This recipe makes 12 8ounce servings. Each serving has 130 calories.

1. What is the ratio of lemons to water in this recipe? ____________
   Write your ratio in simplest form (SF). ____________

2. What is the ratio of lemons to sugar? _________ SF? _______

3. What is the ratio of water to sugar? __________ SF? _______

4. What is the ratio of calories per serving? ________________

5. If you drink 4 servings, how many calories is that? __________

6. You only have 4 lemons and still want to make this recipe. How many cups of water should you use to keep it proportional? _________   How many cups of sugar? __________________________

7. You only have 6 lemons and still want to make this recipe. How many cups of water should you use to keep it proportional? _________   How many cups of sugar? __________________________

8. How many cups of water will you need if you use 3 lemons? _____

9. How many lemons will you need if you use 3 cups of sugar? _____

10. If you decide to drink all the lemonade this recipe makes, how many calories would that be? ______________
Classic Lemonade Ratio and Proportion Answers

8 lemons juiced   10 cups of water   2 cups of sugar
This recipe makes 12 8ounce servings. Each serving has 130 calories.

1. What is the ratio of lemons to water in this recipe? 8/10
   Write your ratio in simplest form (SF). 4/5

2. What is the ratio of lemons to sugar? 8/2  SF? 4/1

3. What is the ratio of water to sugar? 10/2  SF? 5/1

4. What is the ratio of calories per serving? 130/1

5. If you drink 4 servings, how many calories is that? 530

6. You only have 4 lemons and still want to make this recipe. How many cups of water should you use to keep it proportional? 5
   How many cups of sugar? 1

7. You only have 6 lemons and still want to make this recipe. How many cups of water should you use to keep it proportional? 7.5
   How many cups of sugar? 1.5

8. How many cups of water will you need if you use 3 lemons? 3.75

9. How many lemons will you need if you use 3 cups of sugar? 12

10. If you decide to drink all the lemonade this recipe makes, how many calories would that be? 1,560
1 Sugar Free Baby Cait Lemonade (Sweetest)

- 6 freshly squeezed lemons
- 8 cups of water
- 2 cups of Stevia in the Raw Bakers Bag
- Mix together and pour over ice

This recipe makes about 9 servings
Each serving is 8 fluid ounces and has 10 calories
Sugar Free Baby Cait Lemonade (Less Sweet)

- 6 freshly squeezed lemons
- 8 cups of water
- 1 1/2 cups of Stevia in the Raw Bakers Bag
- Mix together and pour over ice

This recipe makes about 9 servings
Each serving is 8 fluid ounces and has 10 calories
Sugar Free Baby Cait Lemonade 1

1. If you \textit{double} this recipe, how many lemons will you need? __________
   How many cups of water will you use? ________________
   How many cups of Stevia will you use? ________________
   How many servings will you have if you double this recipe? ________

2. If you \textit{triple} the recipe, how many lemons will you need? __________
   How many cups of water will you use? ________________
   How many cups of Stevia will you use? ________________
   How many servings will you have if you double this recipe? ________

3. You are expecting 40 people at the baby shower. How many batches of Lemonade should you make? __________
   Why? ____________________________________________________________________________

4. If you decide to cut this recipe in \textit{half} how many lemons will you need? ________________
   How many cups of water will you use? ________________
   How many cups of Stevia will you use? ________________
   How many servings will you have if you half this recipe? ________
Sugar Free Baby Cait Lemonade Answers 1

5. If you **double** this recipe, how many lemons will you need? **12**
   How many cups of water will you use? **16**
   How many cups of Stevia will you use? **Sweet 4 Less Sweet 3**
   How many servings will you have if you double this recipe? **18**

6. If you **triple** the recipe, how many lemons will you need? **18**
   How many cups of water will you use? **24**
   How many cups of Stevia will you use? **Sweet 6 Less Sweet 4.5**
   How many servings will you have if you triple this recipe? **27**

7. You are expecting 40 people at the baby shower. How many batches of Lemonade should you make? **5**
   Why? **4 is not enough (36) will need 5**

8. If you decide to cut this recipe in **half** how many lemons will you need? **3**
   How many cups of water will you use? **4**
   How many cups of Stevia will you use? **Sweet 1 Less Sweet .75 or ¾**
   How many servings will you have if you half this recipe? **4.5**
1. What is the ratio of lemons to water in this recipe? Write your ratio 3 ways. _____________________________________________
   Write your ratio in simplest form (SF). _______________________

2. What is the ratio of lemons to Stevia? ___________ SF? ______

3. What is the ratio of water to lemons? ___________ SF? ______

4. What is the ratio of Stevia to water? ___________ SF? ______

5. You only have 3 lemons and still want to make this recipe. How many cups of water should you use to keep it proportional? ______

6. You only have 1 cup of Stevia. How many lemons should you use to keep it proportional? ____ How many cups of Stevia? ____________

7. You have 9 lemons and company coming. If you use all 9 lemons, how many cups of Stevia should you use? ____________ How many cups of water? ____________
   How many 8 fluid ounce servings will that make? ________________
8. What is the ratio of lemons to water in this recipe? Write your ratio 3 ways. \(6 \text{ to } 8\) \(6:8\) \(6/8\)
Write your ratio in simplest form (SF). \(3/4\)

9. What is the ratio of lemons to Stevia? \(\text{Sweet } 6/2 \ 3/1 \ \text{Less } 6/1.5 \ 2/1.5\)

10. What is the ratio of water to lemons? \(8/6\) \(\text{SF? } 4/3\)

11. What is the ratio of Stevia to water? \(\text{Sweet } 2/8 \ 1/4 \ \text{Less } 1.5/8 \ .75/4\)

12. You only have 3 lemons and still want to make this recipe. How many cups of water should you use to keep it proportional? \(4\)

13. You only have 1 cup of Stevia. How many lemons should you use to keep it proportional? \(3\) How many cups of Stevia? \(\text{Sweet } 1 \ \text{Less } .75 \text{ or } 3/4\)

14. You have 9 lemons and company coming. If you use all 9 lemons, how many cups of Stevia should you use? \(\text{Sweet } 3 \ \text{Less } 2.25 \text{ or } 1 \ 1/4\)
How many cups of water? \(12\)
How many 8 fluid ounce servings will that make? \(13.5\)