Do you like smoothies? Perhaps one of the best things about smoothies is that you can make one with just about any ingredients. Just throw them in the blender and turn it on!

Smoothies can be very healthy too. Try this healthy smoothie recipe sometime.

- 1 banana
- 1 cup of vanilla yogurt
- 1 cup of grapes
- \(\frac{1}{2}\) of an apple
- 2 cups of spinach leaves

If this recipe serves 3 people, how much of each ingredient would you need to make smoothies your whole class?
Problem 1  May the Best Recipe Win

Each year, your class presents its mathematics portfolio to parents and community members. This year, your homeroom is in charge of the refreshments for the reception that follows the presentations. Four students in the class give their recipes for punch. The class wants to analyze the recipes to determine which will make the punch with the strongest grapefruit flavor, and which will make the strongest lemon-lime soda flavor. The recipes are shown.

- **Adam's Recipe**
  - 4 parts lemon-lime soda
  - 8 parts grapefruit juice

- **Bobbi's Recipe**
  - 3 parts lemon-lime soda
  - 5 parts grapefruit juice

- **Carlos's Recipe**
  - 2 parts lemon-lime soda
  - 3 parts grapefruit juice

- **Zeb's Recipe**
  - 1 part lemon-lime soda
  - 4 parts grapefruit juice

1. How many total parts are in each person's recipe?

2. For each recipe, write a ratio that compares the number of parts of grapefruit juice to the total number of parts in each recipe. If possible, simplify each rate.

   - **Adam's recipe:**
   
   - **Bobbi's recipe:**
   
   - **Carlos's recipe:**
   
   - **Zeb's recipe:**
3. Which recipe will make the punch with the strongest grapefruit taste? Explain how you determined your answer.

4. For each recipe, write a rate that compares the number of parts of lemon-lime soda to the total number of parts in each recipe. If possible, simplify each rate.

   Adam’s recipe:

   Bobbi’s recipe:

   Carlos’s recipe:

   Zeb’s recipe:

5. Which recipe will make the punch with the strongest lemon-lime soda flavor? Explain how you determined your answer.
**Problem 2  Making the Refreshments**

1. You are borrowing glasses from the cafeteria to serve the punch. Each glass holds 6 fluid ounces of punch. Your class expects that 70 students and 90 parents and community members will attend the reception. You decide to make enough punch so that every person who attends can have one glass of punch. How many fluid ounces of punch will you need for the reception?

Previously, you wrote rates to compare parts of each ingredient to total parts of all the ingredients. Recall that a rate is a ratio in which the units of the parts or the whole being compared are different.

2. Determine the unit rate for the fluid ounces of punch there would be in one part of the recipe if your class uses Adam's recipe.

3. How many fluid ounces of lemon-lime soda and grapefruit juice are needed to make enough punch if your class uses Adam's recipe? Show all your work.
4. How many fluid ounces of lemon-lime soda and grapefruit juice are needed to make enough punch if your class uses Bobbi's recipe? Show all your work.

5. How many fluid ounces of lemon-lime soda and grapefruit juice are needed to make enough punch if your class uses Carlos's recipe? Show all your work.
6. How many fluid ounces of lemon-lime soda and grapefruit juice are needed to make enough punch for the reception if your class uses Zeb's recipe? Show all your work.

7. Complete the table with the calculations you determined for each person's recipe.

<table>
<thead>
<tr>
<th></th>
<th>Amount of Lemon-Lime Soda (fluid ounces)</th>
<th>Amount of Grapefruit Juice (fluid ounces)</th>
<th>Total Amount of Punch (fluid ounces)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam's recipe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bobbi's recipe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carlos's recipe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zeb's recipe</td>
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</tbody>
</table>
8. In Problem 1, Question 3 you determined which recipe would have the strongest grapefruit flavor? How does the table confirm your choice?

9. In Problem 1, Question 5 you determined which recipe would have the strongest lemon-lime soda flavor? How does the table confirm your choice?

10. If you would use 8-ounce glasses for the reception rather than 6-ounce glasses, how would that affect the amount of punch you would need to make?

11. Will the ratio of the parts for any of the recipes change by putting more punch in each glass? Explain your reasoning.
Talk the Talk

1. Explain how ratios and rates helped you solve the problems in this lesson.

Be prepared to share your solutions and methods.