



# Grade 7 Student Work

*Comparing and Scaling* Problem 1.2



Ratios, Rates,  
Percents, and  
Proportions

From the Student Book:

## 1.2 Mixing Juice

### Comparing Ratios

Every year, the Grade 7 students at Langston Hughes School go on an outdoor education camping trip. During the week-long trip, the students study nature and participate in recreational activities. Everyone pitches in to help with the cooking and cleanup.

This year, Arvin and Mariah were in charge of making orange juice for the campers. They planned to make the juice by mixing water and frozen orange juice concentrate. To find the mix that would taste best, they decided to test some mixes.



? Which mix will make juice that is the most "orangey?" Explain.

Connected Mathematics® is a registered trademark of Pearson Education, Inc.  
 ©2014 by Michigan State University

### Problem 1.2

- A**
1. Which mix will make juice that is the most “orangey”? Explain your reasoning.
  2. Which mix will make juice that is the least “orangey”? Explain your reasoning.

- B**
1. Isabelle and Doug used fractions to express their reasoning.

Isabelle:  
 $\frac{5}{9}$  of Mix B is concentrate.

Doug:  
 $\frac{5}{14}$  of Mix B is concentrate.

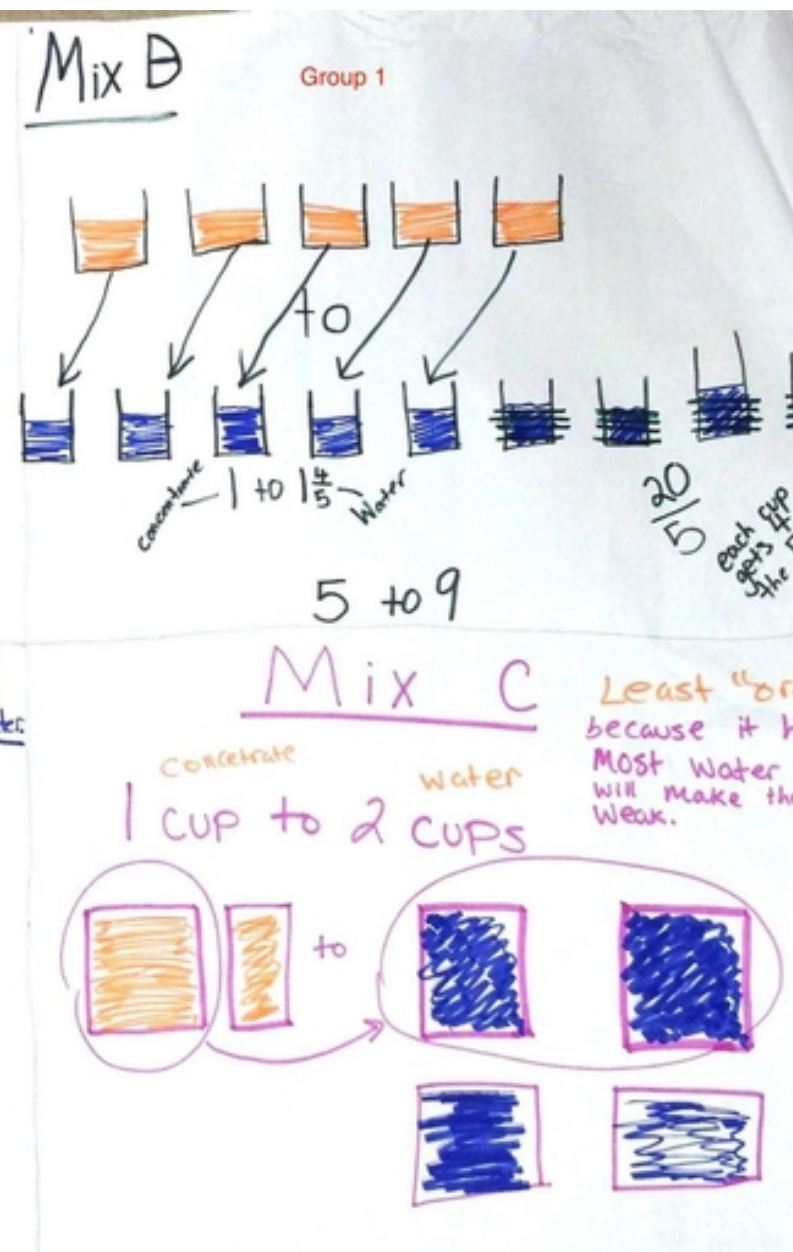
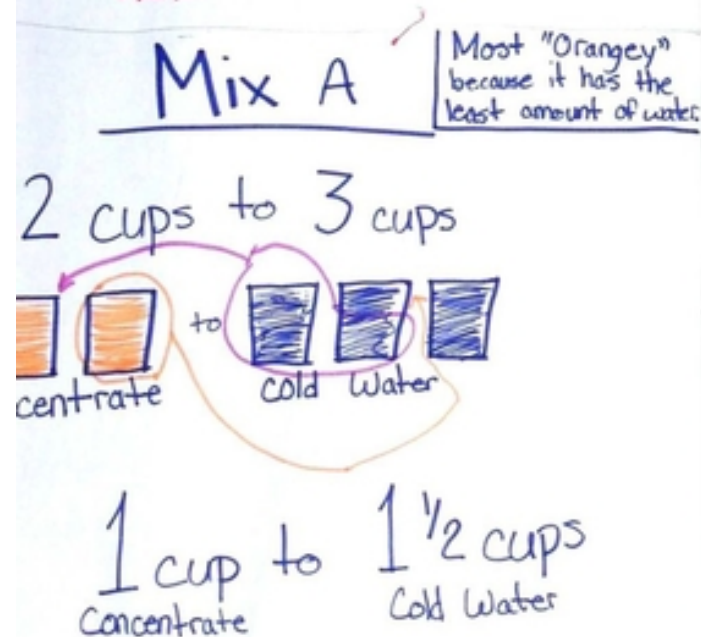
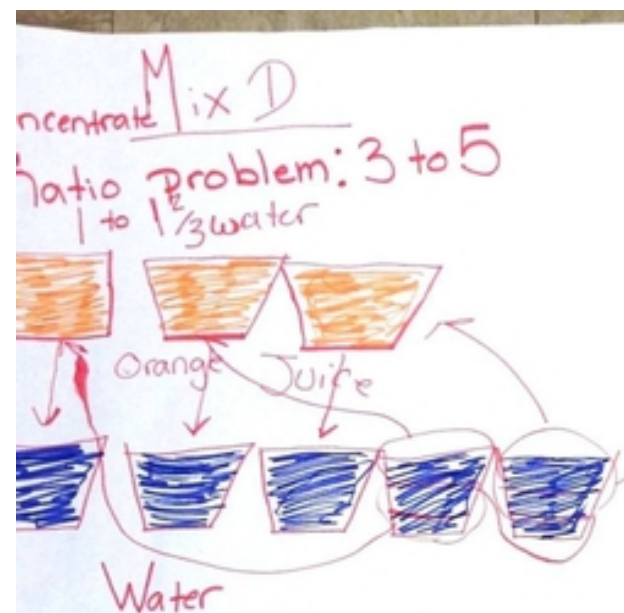
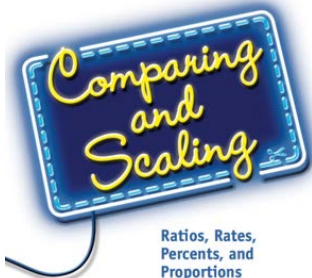
Do you agree with either of them? Explain.

2. Max thinks that Mix A and Mix C are the same. Max says “They are both the most ‘orangey’ since the difference between the number of cups of water and the number of cups of concentrate is 1.” Is Max’s thinking correct? Explain.
- C** Assume that each camper will get  $\frac{1}{2}$  cup of juice. Answer Questions (1) and (2) below for *each* of the four recipes.
1. How many batches are needed to make juice for 240 campers?
  2. How much concentrate and how much water are needed to make juice for 240 campers?
- D** For each recipe, how much concentrate is needed to make 1 cup of juice? How much water is needed?

## From the Teacher’s Guide

**Focus Questions:** *What strategies do you use to determine which mix is the most orangey?*

## Group 1





## Group 1

### Strategy

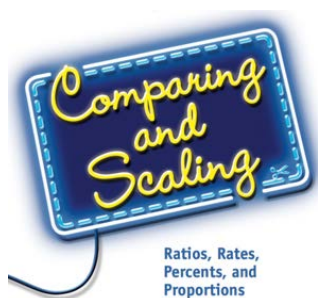
Part to Part

Unit Rate

1 concentrate to \_\_\_\_ water

### Question to Consider

How do the pictures support the numerical reasoning?







## Group 2



Ratios, Rates,  
Percents, and  
Proportions

**Group 2**

**Mix A**

2 Cups Concentrate	3 Cups Cold Water
--------------------	-------------------

2 Cups Concentrate + 3 Cups Cold Water = 5

$\frac{30}{840} = \frac{2}{5} = \text{Concentrate}$   
 $\frac{3}{5} = \text{Cold Water}$

Mix A is most Orangey

**Mix B**

5 cups Concentrate	9 cups Cold Water
--------------------	-------------------

5 cups Concentrate + 9 cups Cold Water = 14

$\frac{300}{840} = \frac{5}{14} = \text{Concentrate}$   
 $\frac{9}{14} = \text{Water}$

**Mix D**

3 Cups Concentrate	5 Cups Cold Water
--------------------	-------------------

3 Cups Concentrate + 5 Cups Cold Water = 8

$\frac{315}{840} = \frac{3}{8} = \text{Concentrate}$   
 $\frac{5}{8} = \text{Water}$

**Mix C**

1 cup Concentrated	2 cups cold water
--------------------	-------------------

1 cup Concentrated + 2 cups cold water = 3

$\frac{280}{840} = \frac{1}{3} = \text{concentrated}$   
 $\frac{2}{3} = \text{water}$

We think Mix C is the least orangey



## Group 2

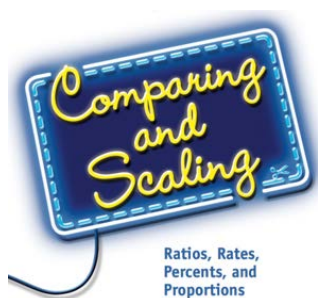
### Strategy

Part to Whole

Scaling-up the ratio to 840 parts or “Common Denominator” of 840

### Question to Consider

Why do you think that the students chose 840 for the denominator?





## Group 3



Ratios, Rates,  
Percents, and  
Proportions

Group 3

MIX A

2 cups concentrate	3 cups cold water
$2 + 3 = 5$	
$\frac{2}{5} = 40\%$	$\frac{3}{5} = 60\%$
$40\% + 60\% = 100\%$	

MIX B

5 cups concentrate	9 cups water
$5 + 9 = 14 \leftarrow \text{total cups}$	
$\frac{5}{14} = 36\%$	$\frac{9}{14} = 64\%$
$5 \div 14 = 36\%$	$9 \div 14 = 64\%$

MIX C

1 cup concentrate	2 cups cold water
$1 + 2 = 3$	
$\frac{1}{3} = 33\%$	$\frac{2}{3} = 66\%$
$33\% + 66\% = 100\%$	

MIX D

3 cups concentrate	5 cups water
$3 + 5 = 8 \leftarrow \text{total cups}$	
$\frac{3}{8} = 37.5\%$	$\frac{5}{8} = 62.5\%$
$3 \div 8 = 37.5\%$	$5 \div 8 = 62.5\%$

- Mix A is the most "orangey". Mix A 40% Orangey
- Mix C is the least "orangey". Mix C 33% ORANGEY





## Group 3

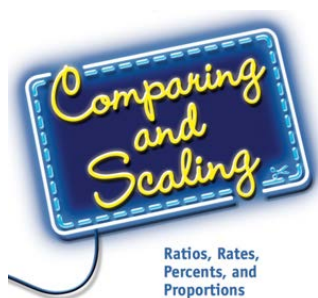
### Strategy

Part to Whole

Percent of water and concentrate in mixes

### Question to Consider

Why do you think that the students chose percents? What do you think the students are trying to communicate with the notation of the percents in Mix C?





## Group 4



Ratios, Rates,  
Percents, and  
Proportions

Mix A has the most Orangey flavor because it had the ~~most amount~~ highest percentage. Mix C is the least Orangey because it had the lowest percentage. Group #4

### Mix A

Mix A

2 cups concentrate	3 cups cold water
-----------------------	----------------------

$$\frac{2}{5} = 2 \div 5 = .4 = \frac{4}{10} = \frac{40}{100} = 40\%$$

### Mix B

Mix B

35%

5 cup Concentrate	9 cup Cold water
----------------------	---------------------

$$\frac{5}{14} = 5 \div 14 = .35 = 35\%$$

### Mix C

Mix C

1 cup Concentrate	2 cups Cold water
----------------------	----------------------

$$\frac{1}{3} = 1 \div 3 = .33 = \frac{33}{100} = 33\%$$

### Mix D

Mix D

37%

3 cups Concentrate	5 cups Cold water
-----------------------	----------------------

$$\frac{3}{8} = 3 \div 8 = .37 = \frac{37}{100}$$



## Group 4

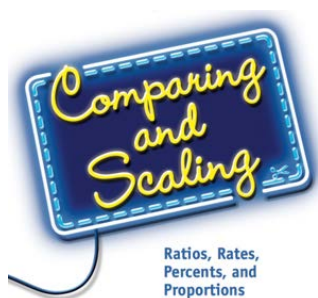
### Strategy

Part to Whole

Percent of concentrate in mixes

### Question to Consider

Why do you think these students know about decimals, fractions, and percents?





## Group 5

**Note:** The decimal in the denominator of Mix A does not prevent students from answering the question correctly.



Ratios, Rates,  
Percents, and  
Proportions

Group #5


**Mix A** - Cups of water: 3  
Cups of concentrate: 2

$\frac{2}{5}$  concentrate  
 $\frac{3}{5}$  water

Mix A is the most concentrated, because it has the largest fraction.

$\frac{2}{5} = \frac{6}{15}$   
 $\frac{3}{5} = \frac{9}{15}$  } not equivalent fractions.

$\frac{2}{5} = \frac{15}{37.5}$  (scaled by 7.5)  
concentrate / total juice



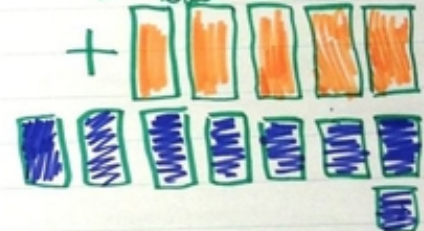
**Mix B**

5 cups concentrate  
9 cups cold water

$\frac{5}{14}$  concentrate  
 $\frac{9}{14}$  cold water

$\frac{5}{14} = \frac{15}{42}$  (scaled by 3)  
concentrate / total juice

2<sup>nd</sup> least concentrated



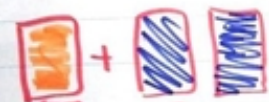
**Mix C**

1 cup concentrate, 2 cups cold water

$\frac{1}{3}$  concentrate  
 $\frac{2}{3}$  water

least concentrated because it had the lowest fraction of concentrate

$\frac{1}{3} = \frac{15}{45}$  (scaled by 15)  
concentrate / total juice




**Mix D** - 3 cups concentrate  
5 cups water

$\frac{3}{8}$  of concentrate  
 $\frac{5}{8}$  of water

$\frac{3}{8} = \frac{15}{40}$  (scaled by 5)  
concentrate / total juice

2<sup>nd</sup> Most Concentrated







## Group 5

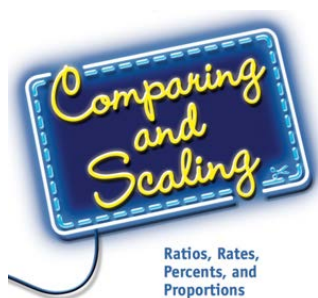
### Strategy

Part to Whole

Scaling-up the ratio to 15 parts concentrate or “Common Numerator” of 15

### Question to Consider

Why do you think that the students chose 15 for the numerator





## Group 6



Ratios, Rates,  
Percents, and  
Proportions

Group #6

### Mix A

2 cups concentrate	3 cups cold water
$2+3=5$	
$\frac{2}{5} = \frac{40}{100}$	$\frac{3}{5} = \frac{60}{100}$

### Mix B

$5+9=14$

5 cups concentrate	9 cups cold water
$\frac{5}{14} = \frac{35.7}{100}$	$\frac{9}{14} = \frac{64.26}{100}$

### Mix C

$1+2=3$

1 cup concentrate	2 cups cold water
$\frac{1}{3} = \frac{33.3}{100}$	$\frac{2}{3} = \frac{66.6}{100}$

### Mix D

$3+5=8$

3 cups concentrate	5 cups cold water
$\frac{3}{8} = \frac{37.5}{100}$	$\frac{5}{8} = \frac{62.5}{100}$

Conclusion:

Mix A is most "orangey" because it has 40/100 concentrate.  
 Mix C is least "orangey" because it has 33.3/100 concentrate.



## Group 6

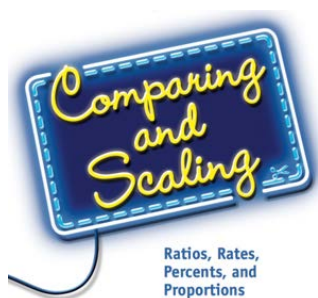
### Strategy

Part to Whole

Scaling-up the ratio to 100 parts or “Common Denominator” of 100

### Question to Consider

Why do you think that the students chose 100 for the denominator?





## Group 7



Ratios, Rates,  
Percents, and  
Proportions

Group #7

Mix A

x30

2 cups Concentrate	3 cups Cold Water
<hr/>	
60	90

Mix C

x45

1 cup Concentrate	2 cups Water
<hr/>	
45 cups concentrate	90 water

**Ratio**

---

Conclusion

We took all of the Cold water numbers and found out they water numbers match the big number. (90) Then we took the concentrated orange juice. and times

Halee Stalmach

Mix B

x10

5 cups Concentrate	9 cups cold water
<hr/>	
50 cups	90 cups

Mix D

3 cups Concentrate	5 cups Water
<hr/>	
30	90
54	90

Answers.

~~This is the~~  
 The most Orangy juice is Mix A and the least Orangy juice is Mix D. ~~Mix C~~

The most orangy juice is mix A because, it has more concentrate with the same water and it is ~~30 cups~~ of water more than concentrated. The least orangy juice is Mix D because it has 60 cups more water than concentrated juice. it has less concentrate with ~~more~~ the same water.





## Group 7

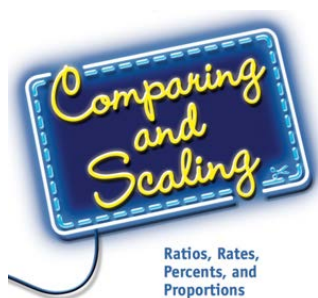
### Strategy

Part to Part

Scaling-up the ratio to 90 parts water

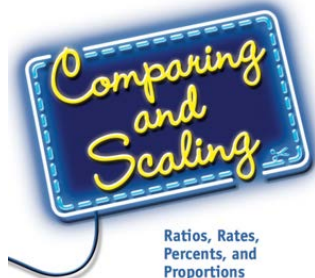
### Question to Consider

Why do you think that the students scaled the ratio to 90 cups water?





## Group 8



Ratios, Rates,  
Percents, and  
Proportions

### Mix A

2 cups concentrate    3 cups water

$2+3=5$

$\frac{2}{5}$  or  $\frac{2}{5}$  or  $\frac{2}{5}$

$2 \div 5 = .4$      $3 \div 5 = .6$

concentrate

### Mix B

Group #8

2 cups concentrate    9 cups cold water

$2+9=11$  or  $9+2=11$

$\frac{2}{11}$  or  $\frac{9}{11}$

concentrate

Mix A is the most orange because they have the biggest + decimal.

### Mix C

1 cup concentrate    2 cups cold water

$1+2=3$  or  $\frac{1}{3}$  or  $\frac{2}{3}$  ← water

concentrate

$1 \div 3 = .3333333333$

$2 \div 3 = .6666666667$

### Mix D

3 cups Concentration + 5 cups Cold Water = 8

$\frac{3}{8} = .375$  ← Concentration

$\frac{5}{8} = .625$  ← Cold Water



## Group 8

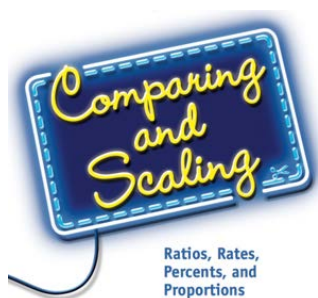
### Strategy

Part to Whole

Portion of concentrate and water in decimal form

### Question to Consider

Why do you think that these students chose to use decimals? How might these students label the units of the decimals? Do you think that they students understand that they have a unit rate?





## Group 9



Ratios, Rates,  
Percents, and  
Proportions

Conclusion all of us and green Group #9

**Mix A**  
 $\begin{matrix} 3 \\ \times 1.5 \end{matrix} \rightarrow \begin{matrix} 4.5 \\ 3 \text{ cups (water)} \end{matrix}$   
 $\begin{matrix} 2 \\ \times 1.5 \end{matrix} \rightarrow \begin{matrix} 3 \\ 2 \text{ cups (concentrate)} \end{matrix}$   
 $2+3=5 \rightarrow \frac{2}{5}$   
 $3+4.5=7.5 \rightarrow \frac{3}{7.5}$

**Mix B**  
 $\begin{matrix} 5 \\ \times 1.8 \end{matrix} \rightarrow \begin{matrix} 9 \\ 5 \text{ cups (concentrate)} \end{matrix}$   
 $\begin{matrix} 3 \\ \times 1.8 \end{matrix} \rightarrow \begin{matrix} 5.4 \\ 3 \text{ cups (water)} \end{matrix}$   
 $5+9=14 \rightarrow \frac{5}{14}$   
 $3+5.4=8.4 \rightarrow \frac{3}{8.4}$

**Mix C**  
 $\begin{matrix} 3 \\ \times 3 \end{matrix} \rightarrow \begin{matrix} 9 \\ 3 \text{ cups of concentrate} \end{matrix}$   
 $\begin{matrix} 6 \\ \times 3 \end{matrix} \rightarrow \begin{matrix} 18 \\ 6 \text{ cups of cold water} \end{matrix}$   
 $\frac{1}{3}$   
 $\frac{2}{3}$

**Mix D**  
 $\begin{matrix} 3 \\ \times 5 \end{matrix} \rightarrow \begin{matrix} 15 \\ 3 \text{ cups of concentrate} \end{matrix}$   
 $\begin{matrix} 5 \\ \times 5 \end{matrix} \rightarrow \begin{matrix} 25 \\ 5 \text{ cups of cold water} \end{matrix}$   
 $\frac{3}{8}$   
 $\frac{5}{8}$

**Conclusion:** Mix A was the most "orangest", we found this out by comparing the ~~fractions~~ <sup>ratios using scaling</sup>.  
 Mix C is the least "orangest", we this, by first finding the common ~~denominator~~ <sup>concentrate</sup>, then comparing the ~~fractions~~ <sup>Ratio's</sup>, and the amount of concentrate and cold water. We used this method for finding both "orangest" and least "orangest." Also we were comparing we found scale factor the mixtures.





## Group 9

### Strategy

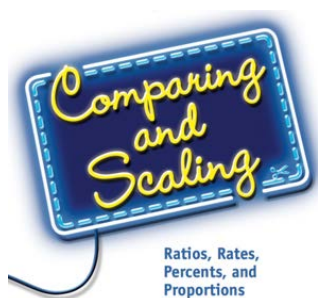
Part to Part

Scaled Ratios

**Note:** Students seem to informally understand the Transitive Property

### Question to Consider

Why do you think that the students did not scale to make one part equal in all of the ratios?





## Group 10

**Note:** The fraction in the numerators of Mix C and Mix D does not prevent students from answering the question correctly.



Ratios, Rates,  
Percents, and  
Proportions

Group #10

### Mix A

$$\frac{2 \times 14 = 28}{5 \times 14 = 70}$$

### Mix B

$$\frac{5 \times 5 = 25}{14 \times 5 = 70}$$

### Mix C

$$\frac{1 \times 23\frac{1}{3}}{3 \times 23\frac{1}{3} = 70}$$

### Mix D

$$\frac{3 \times 8\frac{3}{4} = 26\frac{1}{4}}{8 \times 8\frac{3}{4} = 70}$$

We decided to change all of the denominator to 70 and multiply the numerator by the number that the denominator to 70, which is the same factor.

In our conclusion we discovered that Mix A was the strongest and Mix C was the least strongest. Because Mix A has the highest concentration at 28 and Mix C has the lowest concentration at  $23\frac{1}{3}$ .



## Group 10

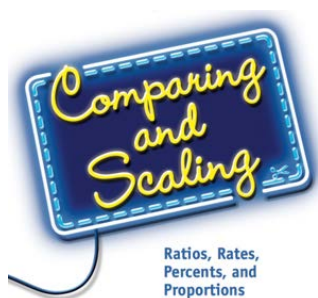
### Strategy

Part to Whole

Scaling-up the ratio to 70 parts or Common Denominator of 70

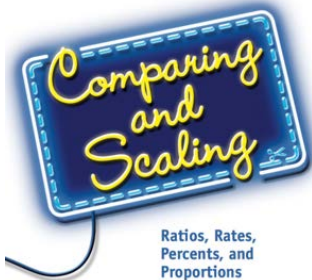
### Question to Consider

Why do you think that the students chose 70 for the denominator?





**Group 11**



**A:**  $2 + 3 = 5$   
 $\frac{2}{5} = 40\%$      $\frac{3}{5} = 60\%$

---

**B:**  $5 + 9 = 14$   
 $\frac{5}{14} = 36\%$      $\frac{9}{14} = 64\%$

**C:**  $1 + 2 = 3$   
 $\frac{1}{3} = 34\%$      $\frac{2}{3} = 66\%$

**D:**  $3 + 5 = 8$   
 ~~$\frac{3}{8} = 38\%$~~      $\frac{3}{8} = 38\%$      ~~$\frac{5}{8} = 62\%$~~      $\frac{5}{8} = 62\%$

**Most: A**

**Least: C**

A is the most orangey because it has the most % of concentrate.

C is the least orangey because it has the least % of concentrate.





## Group 11

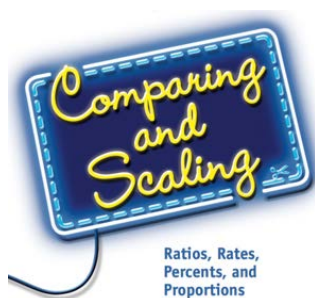
### Strategy

Part to Whole

Percent of water and concentrate in mixes

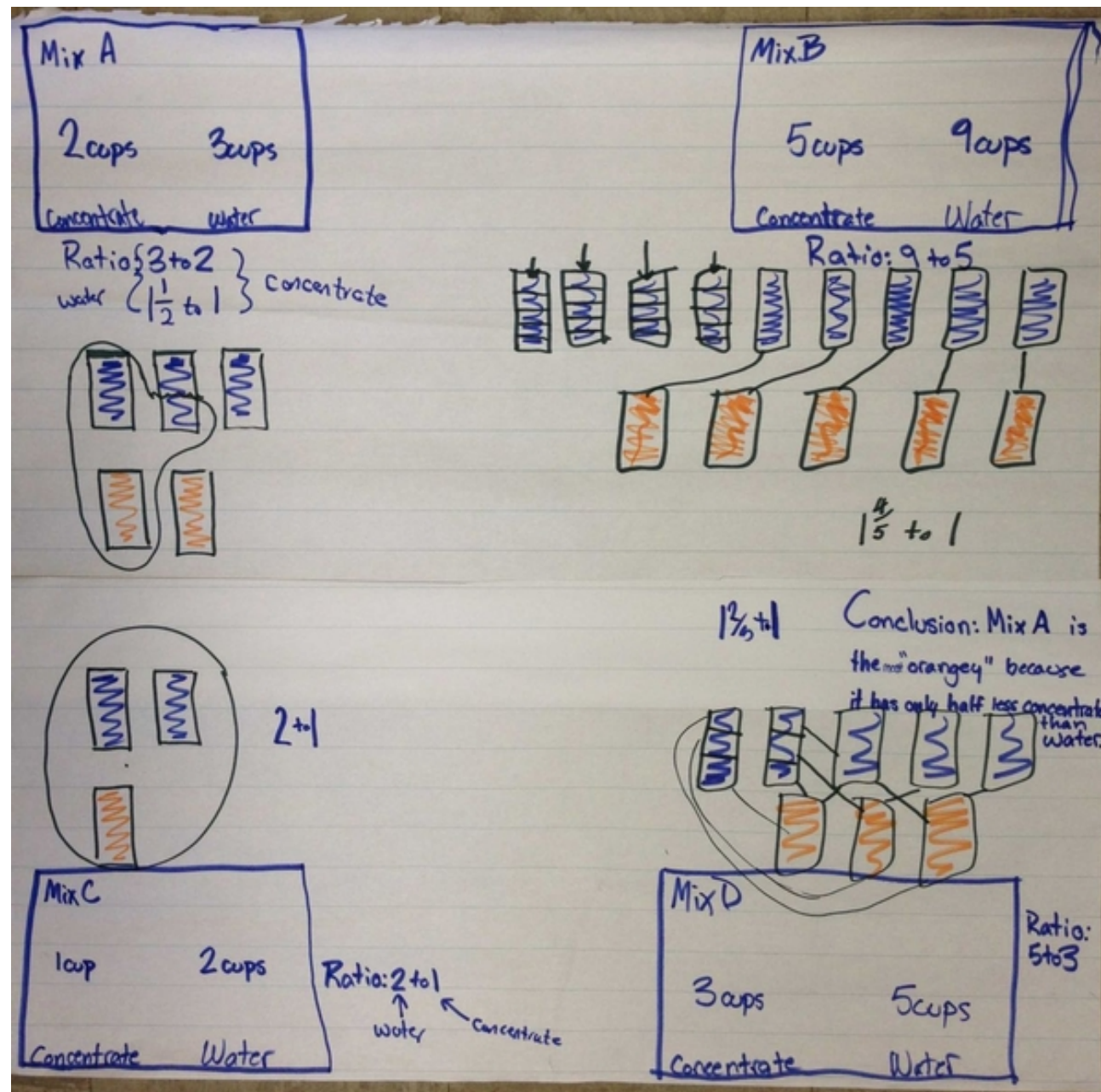
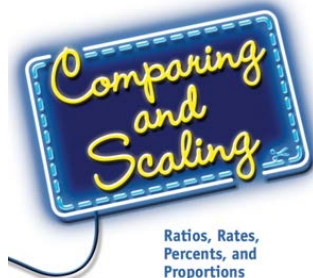
### Question to Consider

Why do you think that the students chose percents? Does it matter that the students rounded to the nearest whole percent?





## Group 12





## Group 12

### Strategy

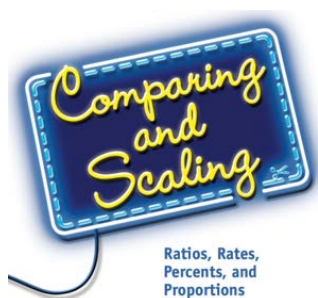
Part to Part

Unit Rate

\_\_\_ water to 1 concentrate

### Question to Consider

How do the pictures support the numerical reasoning?





## Group 13



Ratios, Rates,  
Percents, and  
Proportions

Mix A

2 cups  
Concentrate

3 cups  
Water

$$2c + 3w = 5$$

$\frac{40}{100} = \frac{2}{5} \text{ con}$

$\frac{60}{100} = \frac{3}{5} \text{ water}$

⑤

Mix B

5 cups of  
Concentrate

9 cups of Cold  
Water

$$5 + 9 = 14 \text{ cups}$$

Concentrate:  $\frac{5}{14}$   
Water:  $\frac{9}{14}$

$\frac{5}{14} = \frac{35.7}{100}$

$\frac{9}{14} = \frac{64.26}{100}$

$100 \div 14 = 7.14$   
 $7.14 \times 5 = 35.7$

Mix C

1 cup  
concentrate

2 cups  
cold water

$$1 \text{ cup} + 2 \text{ cups} = 3 \text{ cups}$$

$\frac{1}{3} \text{ con} = \frac{33.3}{100}$

$\frac{2}{3} \text{ water} = \frac{66.6}{100}$

Mix D

3 cups  
concentrate

5 cups  
cold water

$$3c + 5w = 8 \text{ cups}$$

concentrate =  $\frac{3}{8}$       water =  $\frac{5}{8}$

$\frac{3}{8} = \frac{37.5}{100}$  ← concentrate

$\frac{5}{8} = \frac{62.5}{100}$

$100 \div 8 = 12.5$   
 $12.5 \times 3 = 37.5$

Conclusion:

Mix A, with  $\frac{40}{100}$  concentrate, is the most "orangey."

Mix C, with  $\frac{33.3}{100}$  concentrate, is the least "orangey."





## **Group 13**

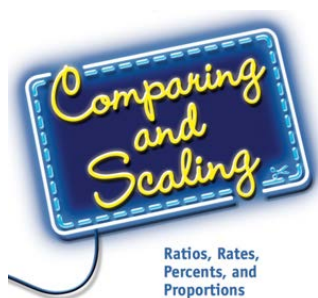
### **Strategy**

Part to Whole

Scaling-up the ratios to 100 parts or “Common Denominator” of 100

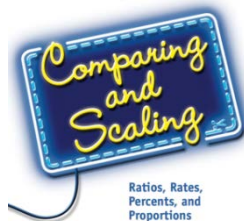
### **Question to Consider**

Why do you think that the students chose 100 for the denominator?

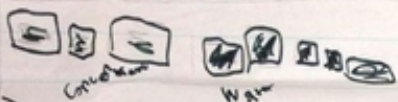




## Group 14



Group #14



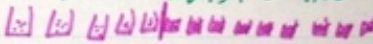
Other ratio for mix 16 km  
= 1.66666

Ratio is  $\frac{5}{3}$

$5 \div 3 = 1.666$

**Water To Concentrate**  
B.


9 to 5 = 1.8 is the ratio



this mix is strong because  
the water doesn't double  
the concentrate

**WATER TO CONCENTRATE**  
C.


2 to 1 = 2 is the Ratio  
The higher number, the  
weaker the taste.



In order to over power the  
strong taste, the water needs  
to double the concentrate

**WATER TO CONCENTRATE**  
A.  $\frac{W}{C}$

$\frac{3}{2}$  to  $\frac{1}{2} = 1.5$  is the ratio.  
The higher the number, the weaker  
the taste.



In order to over power the  
strong taste, the water needs to  
be double the concentrate.

In conclusion, we discovered that the higher the number, the weaker the substance will be. A is the strongest because the water isn't more than double of the concentrate, causing it to be the strongest.



## Group 14

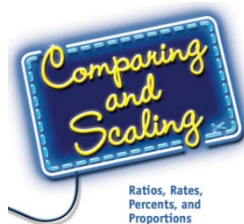
### Strategy

Part to Part

Unit Rate – amount of water to 1 concentrate

### Question to Consider

Do these students seem to understand that they have a unit rate or did they “lose” a number in the comparison? After dividing, the students call the decimal “is the ratio”. How might these students label the units?

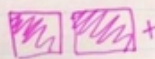


## Group 15

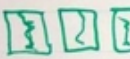



Ratios, Rates,  
Percents, and  
Proportions



**Mix A**


 $= 5$ 
 $\frac{2}{5}$  Concrete  $\frac{3}{5}$  water

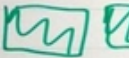

**Mix B**


 $+ 14$ 

 $= 14$ 
 $\frac{5}{14}$  concrete  $\frac{9}{14}$  water

**Mix C**


 $+ 1$ 

 $=$  concentrate  $\frac{1}{3}$  water  $\frac{2}{3}$

**Mix D**


 $+ 8$ 

 $= 1$ 
 $\frac{3}{8}$  Concrete  $\frac{5}{8}$  Water

We think Mix **B** has ~~more concentrate than~~ water and than all the others. Because it has more concentrate  $\frac{572}{1680}$  and all of the other ones have less.

We think that Mix **C** has more water than concentrate. Because it has  $\frac{560}{1680}$  which is the least amount of concentrate.

**Comparison Diagram:**

- Mix B:**  $\frac{5}{14} \xrightarrow{\times 120} \frac{600}{1680}$
- Mix A:**  $\frac{3}{5} \xrightarrow{\times 336} \frac{1008}{1680}$  (most)
- Mix C:**  $\frac{1}{3} \xrightarrow{\times 560} \frac{560}{1680}$  (least)
- Mix D:**  $\frac{3}{8} \xrightarrow{\times 210} \frac{630}{1680}$





## Group 15

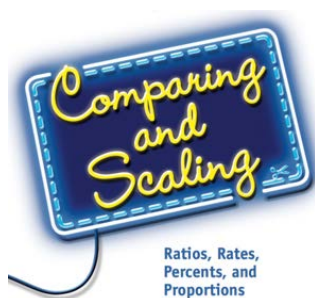
### Strategy

Part to Whole

Scaling-up the ratio to 1680 parts or “Common Denominator” of 1680

### Question to Consider

Why do you think that the students chose 1680 for the denominator? Is this the least common denominator (LCM)? Does it matter if they find the LCM?





Group 16



Ratios, Rates,  
Percents, and  
Proportions

Group #16

Mix A

2 cups Concentrate      3 cups Water

$$\frac{2}{3+2} = \frac{40}{100}$$

$$5 \times 20 = 100$$

$$\frac{3}{3+2} = \frac{60}{100}$$

100%

Mix B

5 cups Concentrate      9 cups Water

$$\frac{5}{5+9} \approx \frac{36}{100}$$

≈ 36%

$$\frac{9}{9+5} \approx \frac{64}{100}$$

≈ 64%

$$14 \times 7.142857143 = 100$$

Mix C

1 cup Concentrate      2 cups Water

≈ 33%

≈ 67%

$$\frac{1}{1+2} \approx \frac{33}{100}$$

$$\frac{2}{1+2} \approx \frac{67}{100}$$

$$3 \times 33.33 = 100$$

Mix D

3 cups Concentrate      5 cups Cold Water

≈ 38%

≈ 62%

$$\frac{3}{3+5} \approx \frac{38}{100}$$

$$\frac{5}{3+5} \approx \frac{62}{100}$$

$$100 \div 8 = 12.5$$

Conclusion - Mix A would make the most "orangey"! Mix C will make the least orangey drink, mix A is the most "orangey" because it has the highest percent of concentrate, and mix C is the least because it has the lowest % in it.



## Group 16

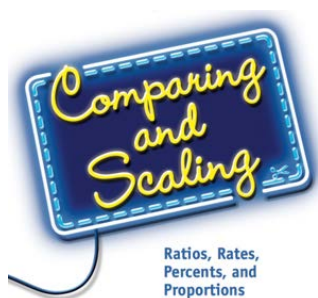
### Strategy

Part to Whole

Percent and “common denominator of 100” for both water and concentrate in mixes

### Question to Consider

What do you think these students understand about percents?





## Group 17




Ratios, Rates,  
Percents, and  
Proportions

Group #17

MIX A

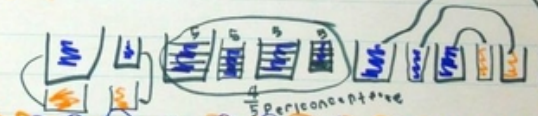
Mix-A is the strongest cuz it has the less am of water for 1 concen

1 } water  $\frac{1}{2}$  

$\frac{2}{2} = 1.5$  WATERS to 1 Concentrate

MIX B

$\frac{4}{5} = 1.8$  Water to 1 Concentrate


9 Water  
5 Concentrate 1.8 

MIX C

Mix C is the weakest because it has more water for concentrate.

$\frac{2}{1}$  Water = 2 waters to 1 Concentrate

MIX D

$\frac{1}{1} = 1 \frac{2}{2}$  Water 1 Concentrate 





## Group 17

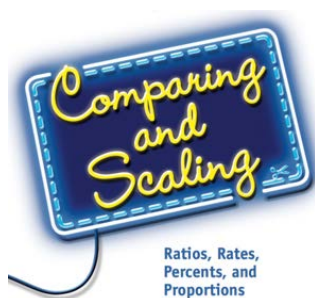
### Strategy

Part to Part

Unit Rate \_\_\_ water to 1 concentrate

### Question to Consider

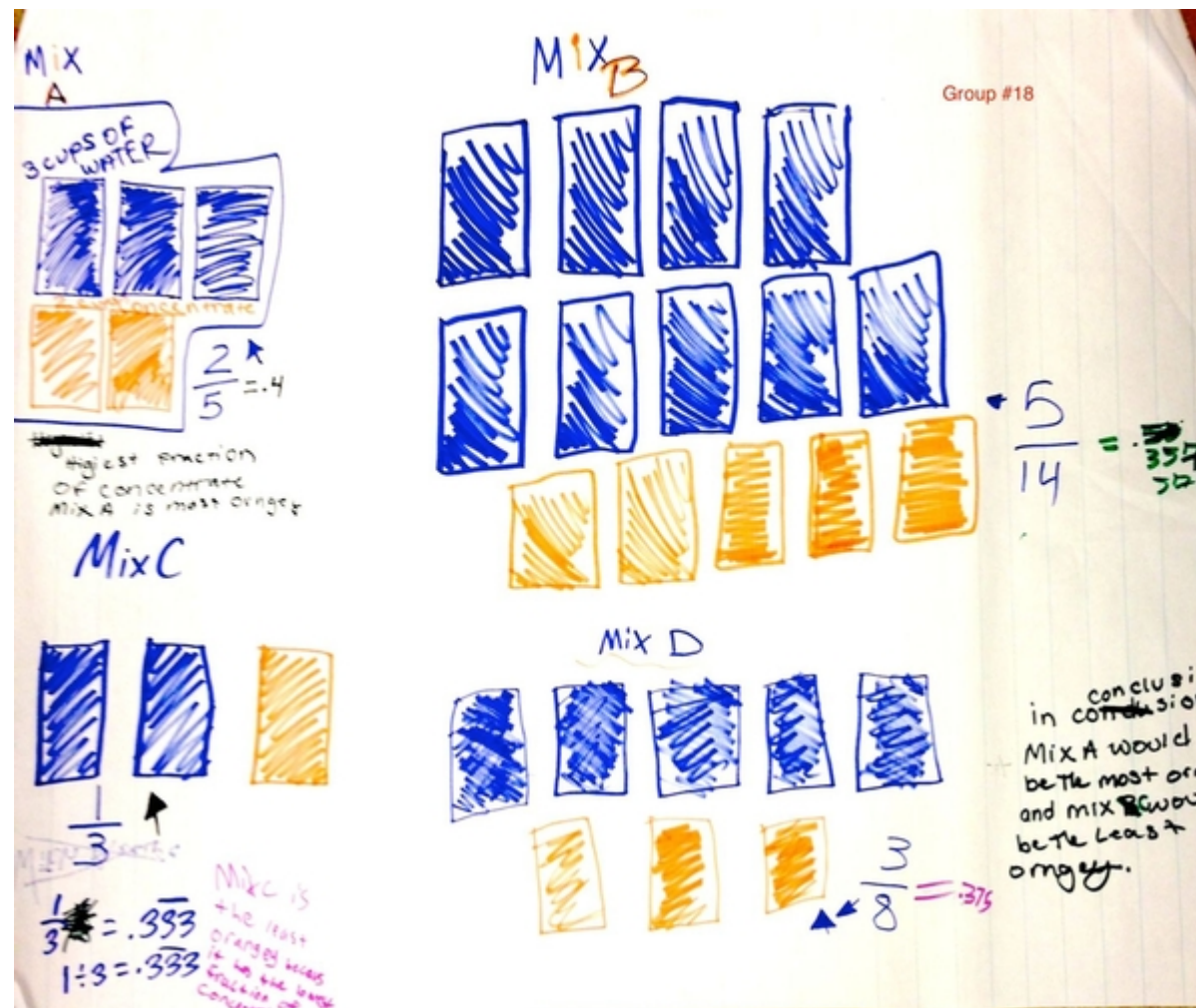
How do the pictures support the numerical reasoning?



## Group 18



Ratios, Rates,  
Percents, and  
Proportions





## Group 18

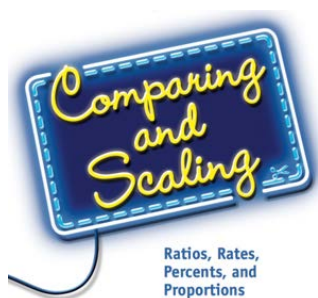
### Strategy

Part to Whole

Portion of concentrate in decimal form

### Question to Consider

Why do you think that these students chose to use decimals? How might these students label the units of the decimals?





## Group 19



Ratios, Rates,  
Percents, and  
Proportions

**Mix A**

$$2 \div 5 = .4 \text{ Concentrate}$$

$$3 \div 5 = .6 \text{ water}$$

$$\frac{2}{5} \text{ cups Concentrate}$$

$$\frac{3}{5} \text{ cups water}$$

**Mix B**

$$\frac{5}{14} = 5 \text{ cups concentrate}$$

$$\frac{9}{14} = 9 \text{ cups water}$$

$$5 \div 14 = .3571428571 \approx \text{Concentrate}$$

$$9 \div 14 = .64285714 \approx \text{water}$$

Group #19

**Mix C**

$$1 \div 3 = .33 \text{ Concentrate}$$

$$2 \div 3 = .66 \text{ water}$$

$$\frac{1}{3} \text{ concentrate}$$

$$\frac{2}{3} \text{ water}$$

**Mix D**

$$\frac{3}{8} \text{ concentrate}$$

$$\frac{5}{8} \text{ water}$$

$$3 \div 8 = .375$$

$$5 \div 8 = .625$$

Mix A is the most "orangy" because it has .4 cups of Concentrate and that is ~~less~~ <sup>More</sup> than the other Concentrates.

Mix C is the least "orangy" because it has .33 cups of concentrate and that's the least out of the mixes.





## Group 19

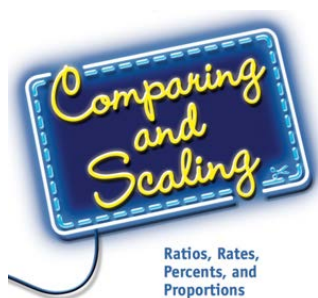
### Strategy

Part to Whole

Portion of concentrate and water in decimal form

### Question to Consider

Why do you think that these students chose to use decimals? Do you think that the students understand that they have unit rates?





**Group 20**



Ratios, Rates,  
Percents, and  
Proportions

Group #20

<p><b>Mix A</b></p> <p>2 cups      3 cups concentrate      cold water</p> $\frac{2}{5} = \frac{60}{100} = 60\%$ <p style="text-align: center;">cold water</p> <p>40% concentrate</p>	<p><b>Mix B</b></p> <p>5 cups      9 cups concentrate      cold water</p> $\frac{5}{14} = 35\%$ <p style="text-align: center;">concentrate</p>
<p><b>Mix C</b></p> <p>1 cup      2 cups concentrate      cold water</p> $\frac{1}{3} = 33\frac{1}{3}\%$ <p style="text-align: center;">concentrate</p>	<p><b>Mix D</b></p> <p>3 cups      5 cups concentrate      cold water</p> $\frac{3}{8} = 37.5\%$

---

conclusion

Mix A has the biggest percent of concentrate  
 so it's the juiciest. Mix C is the least juicy.

😊



## Group 20

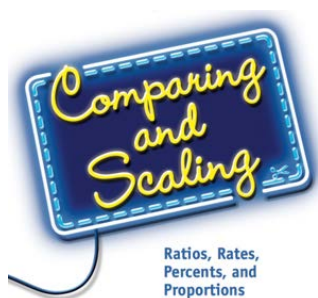
### Strategy

Part to Whole

Percent concentrate in the mixes

### Question to Consider

Why do you think that the students chose percents?





Group 21



Ratios, Rates,  
Percents, and  
Proportions

# MIXING ORANGE JUICE

Group #21

Mix A:  $2/5 = .4$  (concentrate) *most concentrate of all*  
 $3/5 = .6$  (water) *least water amount*

Mix B:  $5/14 = .35$  (concentrate)  
 $9/14 = .64$  (water)

Mix C:  $1/3 = .333$  (concentrate) *least concentrate*  
 $2/3 = .666$  (water) *most water*

Mix D:  $3/8 = .375$  (concentrate)  
 $5/8 = .625$  (water)

Most "orangey"

Least "orangey"

Conclusion:

We found that if we divided the fractions, we would get the decimals for the orange concentrate and water. Afterwards we found that ~~the~~ the biggest decimal for orange concentrate is the most orangey and the smallest decimal for orange concentrate is the least orangey. The least decimal for water is the most orangey and visa-ver the least orangey.





## Group 21

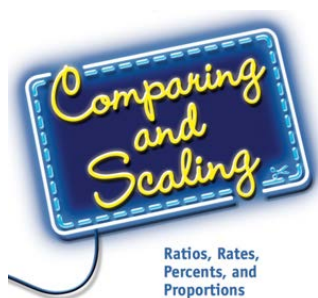
### Strategy

Part to Whole

Portion of concentrate and water in decimal form.

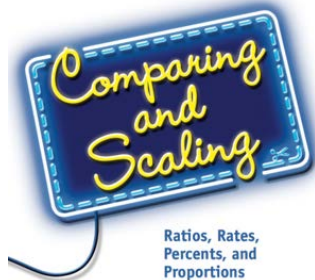
### Question to Consider

Why do you think that these students chose to use decimals? Do you think that the students understand that are using unit rate thinking?





## Group 22



Mix A -  
 $2 \text{ cups} + 3 \text{ cups} = 5 \text{ cups}$   
 $2 \div 5 = 40\%$      $3 \div 5 = 60\%$

Group #22

A - Strongest

D - 2<sup>nd</sup> Strongest

B - 3<sup>rd</sup> Strongest

C - least Strongest  
Concentrate Flavor

Mix B -  
 $5 \text{ cups} + 9 \text{ cups} = 14 \text{ cups}$

$5 \div 14 = 35\%$      $9 \div 14 = 64\%$

If Strongest % Concentrate  
Least Strongest % Water

Mix C -  
 $1 \text{ cup} + 2 \text{ cups} = 3 \text{ cups}$   
 $1 \div 3 = 33\%$      $2 \div 3 = 67\%$

Mix D -  
 $3 \text{ cups} + 5 \text{ cups} = 8 \text{ cups}$   
 $3 \div 8 = 37.5\%$      $5 \div 8 = 62.5\%$



## Group 22

### Strategy

Part to Whole

Percent of water and concentrate in mixes

### Question to Consider

Why do you think that the students chose percents?

