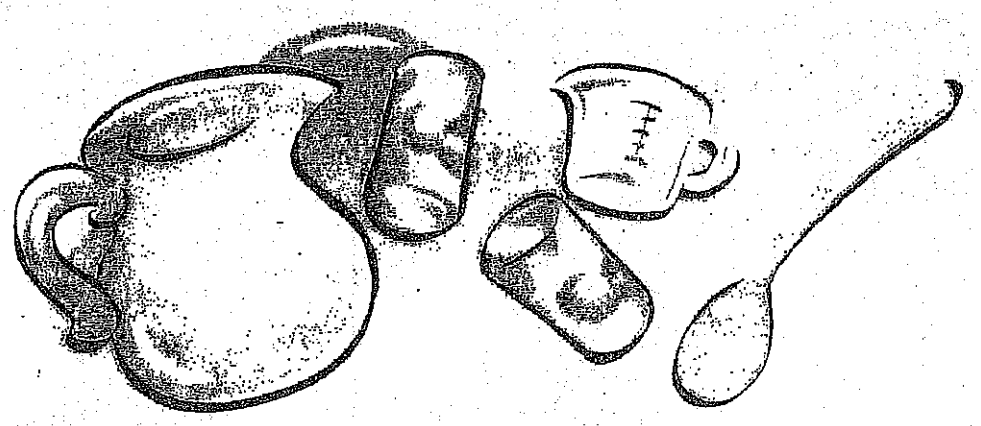
Mixing Juice

Every year, the seventh grade 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.

Arvind and Mariah are in charge of making orange juice for all the campers. They make the juice by mixing water and orange juice concentrate. To find the mix that tastes best, Arvind and Mariah decided to test some recipes on a few of their friends.



Problem 3.1

Arvind and Mariah tested four juice mixes.

Mix A
2 cups concentrate
3 cups cold water

Mix B
1 cup concentrate
4 cups cold water

Mix C
4 cups concentrate
8 cups cold water

Mix D
3 cups concentrate
5 cups cold water

A. Which recipe will make juice that is the most "orangey"? Explain your answer.

B. Which recipe will make juice that is the least "orangey"? Explain your answer.

C. Assume that each camper will get $\frac{1}{2}$ cup of juice. For each recipe, how much concentrate and how much water are needed to make juice for 240 campers? Explain your anwer.

Problem 3.1 Follow-Up

1. How did you use ratios in solving Problem 3.1?
2. For each recipe, how much concentrate and how much water is needed to make 1 cup of juice?

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(A)

Explanation- We reduced the can of concentrate to one and reduced the cans of water accordingly.

A is the most orangy because we rounded all the cans of concentrate down to one and A had the least cans of water compared to B, C, and D.

(B) B is probably the most watered down. If you round all of the cans of concentrate to 1, B had the most water compared to A, C, and D.

mix	Concentrate by 1	water
A	(2) 1.	(3) 1. 5 most Taste
B	1 1	4 4 Least taste
C	4 1	8 2
D	3 1	5 1 2/3

Team 1

Team 2

Mix A

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

$\frac{3}{5} = 60\%$ $3 \div 5 = .6 = 60\%$ water

Mix B

$\frac{1}{5}$ $1 \div 5 = .2 = 20\%$ concentrate

$\frac{4}{5}$ $4 \div 5 = .8 = 80\%$ water

Mix C

$\frac{4}{12}$ $4 \div 12 = .333 =$ concentrate 33%

$\frac{8}{12}$ $8 \div 12 = .6667 =$ water 67%

Mix D

$\frac{3}{8}$ $3 \div 8 = .375 = 38\%$ concentrate

$\frac{5}{8}$ $5 \div 8 = .625 = 62\%$

A. Mix "A" was the orangeyest because it had the most Percent Concentrate. (40%)

B. Mix "B" was the least orangiest because it had the least amount of concentrate.

Mix A: 2+3=5 cups of juice x 3 = 15 cups 6 concentrate + 9 water 6/15 concentrate

Mix B: 1+4=5 cups of juice x 3 = 15 cups 3 concentrate + 12 water 3/15 concentrate

Mix C: 4+8=12 cups of juice x 1.25 = 15 cups 4 x 1.25 = 5 concentrate 8 x 1.25 = 10 water 5/15 concentrate

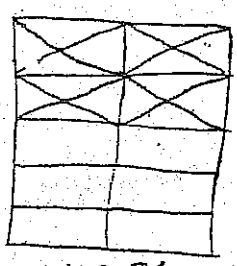
Mix D: 3+5=8 cups of juice x ~~1.88~~ 1.875 = 15 cup 3 x ~~1.88~~ .875 = 5.6 concentrate 5 x 1.88 = 9.4 water 5.6 25/15 concentrate

Most Orangey (most concentrate) per 15 cups of juice

Least Orangey (least concentrate) per 15 cups of juice

Mix A

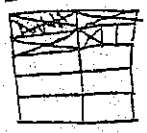
A. Mix A is the most because the 2:3 Ratio is the most concentrate to water.



2/5

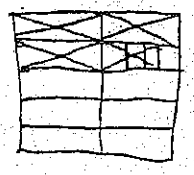
40% Concentrate

Mix C

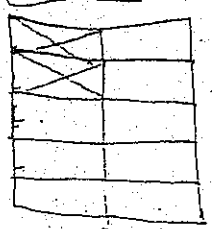


Mix C: 33% 4/12

Mix D: 37% 3/8



Mix B



1/5

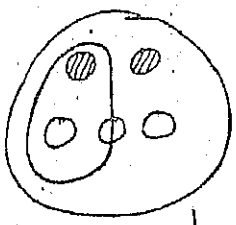
20% Concentrate

B. Mix B is the least Because 1:4 Ratio is the least Concentrated to water.

Team 5

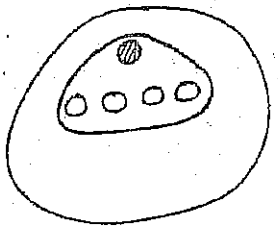
Key ◍ = concentrate
O = water

Mix A

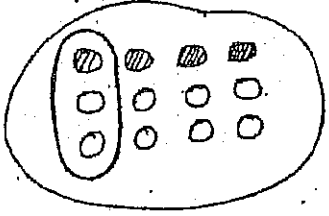


1 concentrate
1½ water

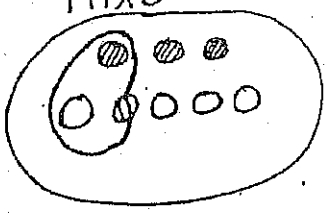
Mix B



Mix C



Mix D



A. mixture(A) would have the most taste
B. mixture(B) would have the least taste

Team 6

WATER

A. ★ mix A - $\frac{3}{5}$ = 60% most orangey
mix B - $\frac{5}{5} \rightarrow \frac{4}{5}$ = 80%
mix C - $\frac{8}{12}$ = 67%
mix D - $\frac{5}{8}$ = 63%

Concentrate

B. mix A - $\frac{2}{5}$ = 40%
★ mix B - $\frac{5}{5} \rightarrow \frac{1}{4}$ = 25% least orangey
mix C - $\frac{4}{8}$ = 50%
mix D - $\frac{3}{5}$ = 60%

A. mix "A" is the most oarngyest because it has the least amount of water added which is $1\frac{1}{2}$ cups of water.

B. mix "B" is the least fruityest because it has 4 cups of water to 1 cup of concentrate.

Mix A

$\frac{2}{3} = \frac{1}{1\frac{1}{2}}$ con. / water

Mix B

$\frac{1}{4}$ con. / water

Mix C

$\frac{4}{8} = \frac{2}{4} = \frac{1}{2}$ con. / water

Mix D

$\frac{3}{5} = \frac{1}{1\frac{2}{3}}$ con. / water

Team 7

Team 8

Mix A - 3/5 water = 60% water
Mix B - 4/5 water = 80% water
Mix C - 8/12 water = 67% water
Mix D - 5/8 water = 63% water

Most orangey - Mix A
Least orangey - Mix B

Mix A 1st (most)

$\frac{2}{5} = \frac{16}{40}$

Mix B 4th (least)

$\frac{1}{5} = \frac{8}{40}$

Mix C 3rd

$4/12 = 13.3/40$

Mix D 2nd

$\frac{3}{8} = \frac{15}{40}$

Team 9

Team 10

Mix A is most orangy, because...

100% ÷ 5 = 20% 1 cup = 20% of the mixture

20% x 2 cups = 40% concentrate

Concentrate

Mix B is the least orangy because...

100% ÷ 5 = 20% 1 cup = 20%

(1+4=5)

1 cup x 20% = 20% concentrate

Mix C is neither because...

100% ÷ 12 = 8% 1 cup = 8%

(4+8)

4 cups x 8% = 32% concentrate

Mix D is neither because...

100% ÷ 8 = 12.5% 1 cup = 12.5%

3 x 12.5% = 37.5% concentrate

Mix A - $\frac{3}{5}$ = 60% Water / 40% concentrate

Mix B - $\frac{4}{5}$ = 80% " / 20% "

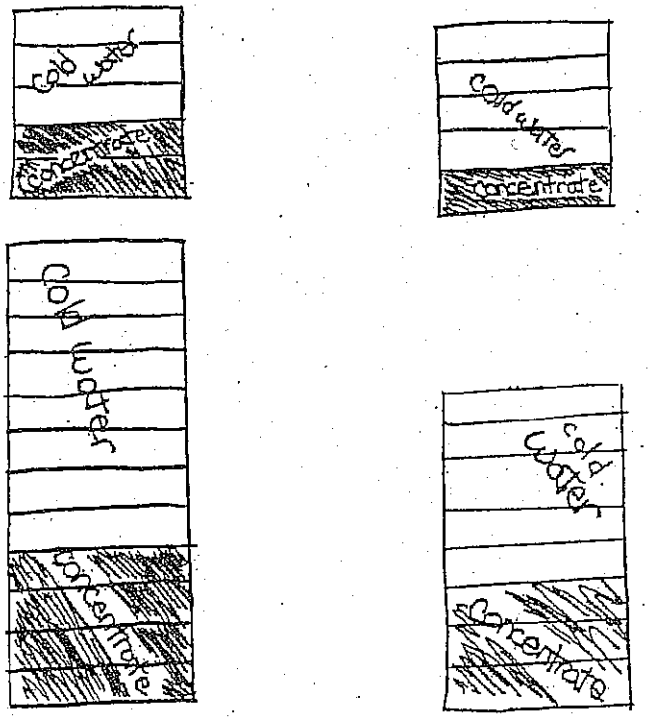
Mix C - $\frac{8}{12}$ = 67% " / 33% "

Mix D - $\frac{5}{8}$ = 63% " / 37% "

A.) Mix A is the most orangey because it is only 60% water, the least watered down.

B.) Mix B is the least orangey because it is 80% water, the most watered down.

Team 12



A) The juice that will taste most orangie is mix "A" because it does not have as much water as mixes B, C, and D.

B) The juice that will taste least orangie is mix "B" because it has more water and less concentrate than Mixes A, C and D.