



Making Lemonade: Teacher Directions Page

Materials: Each group of 4 will need

- 2 cups each filled with $\frac{1}{4}$ cup of lemon juice, per group
- 2 cups of sugar, per group
- 8 cups of water, per group
- 2 scoops (spoons the same size), per group
- Paper Towels
- Copies of the student pages that follow

Suggestions for running the activity:

- Have students work in groups of 3-4
- Have roles for each group member (recorder, sugar scooper, water scooper, leader)
- Give clear directions for behavior with this activity
- Do 1 sample trial as a class (following steps 1-8)
- Prior to having the class work on their own, ask questions to ensure all students know what to do.
- Give the groups 20 minutes to complete as many trials as possible (note that they only get two original amounts of lemon juice, so they will have to “add on” to an original recipe to have more trials.
- Bring the class back together after 20 minutes, and have the students complete the analysis INDIVIDUALLY for 5 minutes. Then allow them to work with their group for 5 minutes. Then, have a few groups who think their lemonade is the best, present this page to the class and give you a taste (you can be the judge).

Big ideas to get from this lesson

- This is a “hook” lesson to help create excitement about this unit!
- Students should be able to write a ratio
- Students should understand how to use a tape diagram to draw a representation of their ratio
- Students should be able to explain (at their level) what a ratio is.

Making Lemonade



Task: Your group will be exploring the ratio of water to sugar in making the world's best lemonade! You will have 2 cups with the lemon juice for your trials, but each cup can be used for multiple trials. Follow the steps below, making sure to record all your work.

Step 1: Begin by pouring $1/4$ cup of lemon juice into your cup.

Step 2: PREDICT: How many scoops of sugar and how many scoops of water will make the perfect cup of lemonade? Record your prediction below:

Scoops of sugar: _____

Scoops of water: _____

Step 3: Write your prediction as a ratio of sugar to water and then as a ratio of water to sugar.

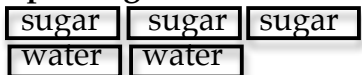
_____ : _____
Sugar Water

_____ : _____
Water Sugar

Step 4: Record your ratio using a tape diagram. See the example below.

Example: Ratio of Sugar to Water- $3 : 2$

Tape Diagram:



Step 5: Test this ratio out! Put in the number of scoops of water and sugar you recorded in your prediction.

Step 6: Stir!

Step 7: Taste and then record how good the lemonade was on a scale of 1 (horrible) to 10 (world's best) with a note about what you want to adjust (e.g., add more sugar, add more water, etc).

Ranking from 1-10: _____

Plans to make it better: _____

Step 8: Repeat these same steps (record work on back) by either adding to what you just made OR beginning again (remember, you only get 2 cups with lemon juice for the experiment!)

Making Lemonade



Trial 2

Step 1: How much lemon juice is now in your cup (recall you started with 1 / 4 cup). _____

Step 2: PREDICT: How many scoops of sugar and how many scoops of water will make the perfect cup of lemonade? Record your prediction below.

*Remember if you are adding on to the prior trial that you need to add what you have in the cup already to what you plan to add this time!!

Scoops of sugar: _____

Scoops of water: _____

Step 3: Write your prediction as a ratio of sugar to water and then as a ratio or water to sugar.

_____ : _____
Sugar Water

_____ : _____
Water Sugar

Step 4: Record your ratio using a tape diagram.

Tape Diagram:

Step 5: Test this ratio out! Put in the number of scoops of water and sugar you recorded in your prediction.

Step 6: Stir!

Step 7: Taste and then record how good the lemonade was on a scale of 1 (horrible) to 10 (world's best) with a note about what you want to adjust (e.g., add more sugar, add more water, etc).

Ranking from 1-10: _____

Plans to make it better: _____

Step 8: Repeat these same steps (record work on back) by either adding to what you just made OR beginning again (remember, you only get 2 cups with lemon juice for the experiment!)

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Trial 3

Step 1: How much lemon juice is now in your cup (recall you started with 1/4 cup). _____

Step 2: PREDICT: How many scoops of sugar and how many scoops of water will make the perfect cup of lemonade? Record your prediction below.

*Remember if you are adding on to the prior trial that you need to add what you have in the cup already to what you plan to add this time!!

Scoops of sugar: _____

Scoops of water: _____

Step 3: Write your prediction as a ratio of sugar to water and then as a ratio or water to sugar.

_____ : _____
Sugar Water

_____ : _____
Water Sugar

Step 4: Record your ratio using a tape diagram.

Tape Diagram:

Step 5: Test this ratio out! Put in the number of scoops of water and sugar you recorded in your prediction.

Step 6: Stir!

Step 7: Taste and then record how good the lemonade was on a scale of 1 (horrible) to 10 (world's best) with a note about what you want to adjust (e.g., add more sugar, add more water, etc).

Ranking from 1-10: _____

Plans to make it better: _____

Step 8: Repeat these same steps (record work on back) by either adding to what you just made OR beginning again (remember, you only get 2 cups with lemon juice for the experiment!)

Making Lemonade



Trial 4

Step 1: How much lemon juice is now in your cup (recall you started with $1/4$ cup). _____

Step 2: PREDICT: How many scoops of sugar and how many scoops of water will make the perfect cup of lemonade? Record your prediction below.

*Remember if you are adding on to the prior trial that you need to add what you have in the cup already to what you plan to add this time!!

Scoops of sugar: _____

Scoops of water: _____

Step 3: Write your prediction as a ratio of sugar to water and then as a ratio or water to sugar.

_____ : _____
Sugar Water

_____ : _____
Water Sugar

Step 4: Record your ratio using a tape diagram.

Tape Diagram:

Step 5: Test this ratio out! Put in the number of scoops of water and sugar you recorded in your prediction.

Step 6: Stir!

Step 7: Taste and then record how good the lemonade was on a scale of 1 (horrible) to 10 (world's best) with a note about what you want to adjust (e.g., add more sugar, add more water, etc).

Ranking from 1-10: _____

Plans to make it better: _____

Step 8: Repeat these same steps (record work on back) by either adding to what you just made OR beginning again (remember, you only get 2 cups with lemon juice for the experiment!)

Making Lemonade



Lemonade Analysis

1. What was the ratio of sugar to water for the BEST lemonade your group was able to make? Write this as a ratio AND by drawing a tape diagram.

Ratio:

Tape Diagram:

2. What *fraction* of this mixture was sugar? (Remember to consider how many scoops of water and sugar you put in)

3. The teacher wants to take your recipe to make lemonade for the whole class. You will begin with 5 cups of lemon juice (remember that you began with $\frac{1}{4}$ cup in your experiment). How many scoops of sugar and how many scoops of water should be added to the 5 cups of lemon juice to make your best recipe for the class? Consider using your tape diagram and expanding it to help you answer this. Show your work below.

Scoops of sugar: _____

Scoops of Water: _____

4. Define the word “ratio” in your own words.

A ratio is _____

_____.