

## SMOOTHIES

### Teaching Guidelines

**Subject:** Mathematics

**Topics:** Fractions (multiplication), Ratios (proportions)

**Grades:** 5 - 7

**Knowledge and Skills:**

- Can multiply fractions
- Can solve a proportion for an unknown

**Materials:**

- at least one blender, two if possible

Smoothie ingredients:

- ripe bananas (1 for every two students)
- fresh strawberries (3 per student)
- oranges (1 for every four students)
- plain yogurt (1 cup for every two students)
- skim milk (1 cup for every two students)
- apple juice (1 cup for every four students)
- 1 bottle vanilla extract
- 1 box of instant oatmeal

For each team:

- a set of measuring spoons and cups
- a quart container
- 4 paper cups

**Procedure:** Students should work in teams of four for this activity.

Give each team a copy of the “Smoothies” handout and a certain amount of one of the smoothie ingredients.

Each team is to choose a smoothie recipe, and decide how much of each of the other ingredients they will need.

In order to do this, they must first find the ratio of the amount of ingredient that you supplied to the amount in the recipe.

*For example, if you supplied  $2\frac{1}{2}$  bananas for smoothie recipe #1, the ratio would be  $2\frac{1}{2}:1$ , which can be simplified as 5:2.*

They must then solve a proportion for each of their other ingredients, setting the ratio of the new amount to the recipe amount equal to the ratio they already determined.

*If they are working with the ratio of 5:2, in order to find the number of strawberries needed they would solve this proportion:*

$$\frac{5}{2} = \frac{n}{4}$$

*(Alternatively, they could multiply each amount by the fraction which expresses the ratio—in this case, by the fraction 5/2.)*

They will then fill in the chart below their recipe with these amounts.

Once you have checked and approved these figures, students may collect the rest of their ingredients from your “pantry” and put them all in their quart containers.

Teams can then take turns using the blender to mix their ingredients, pouring their finished smoothies back into their quart containers. Once all teams have completed the activity, you may allow students to drink their smoothies. (Be sure to have alternative special snacks available for students who have allergies to dairy products or any of the other ingredients.)

Here are suggestions for the amounts of initial ingredients to give the teams:

Smoothie	Difficulty level	Starting ingredient	Factor by which recipe would have to be increased
#1	Easy	3 bananas	3:1
#1	Difficult	2 1/2 bananas	5/2
#2	Easy	8 strawberries	2:1
#2	Difficult	9 strawberries	9/4
#3	Easy	1 1/2 cup yogurt	2:1
#3	Difficult	1 3/4 cup yogurt	7/3
#4	Easy	1 1/2 cup skim milk	3:1
#4	Difficult	3/4 cup skim milk	3/2

# Smoothie Recipes

## Smoothie #1

1 cup skim or low fat milk  
 3/4 cup plain yogurt  
 1 banana  
 4 strawberries  
 ¼ tsp. vanilla extract  
 \_\_\_\_\_ cup skim or low fat milk  
 \_\_\_\_\_ cup plain yogurt  
 \_\_\_\_\_ banana  
 \_\_\_\_\_ strawberries  
 \_\_\_\_\_ tsp. vanilla extract

## Smoothie #2

1 cup skim or low fat milk  
 3/4 cup plain yogurt  
 ½ orange  
 4 strawberries  
 ¼ cup oatmeal  
 \_\_\_\_\_ cup skim or low fat milk  
 \_\_\_\_\_ cup plain yogurt  
 \_\_\_\_\_ orange  
 \_\_\_\_\_ strawberries  
 \_\_\_\_\_ cup oatmeal

## Smoothie #3

½ cup skim or low fat milk  
 3/4 cup plain yogurt  
 ½ cup apple juice  
 1 banana  
 ¼ cup oatmeal  
 \_\_\_\_\_ cup skim or low fat milk  
 \_\_\_\_\_ cup plain yogurt  
 \_\_\_\_\_ cup apple juice  
 \_\_\_\_\_ banana  
 \_\_\_\_\_ cup oatmeal

## Smoothie #4

½ cup skim or low fat milk  
 3/4 cup plain yogurt  
 ½ cup apple juice  
 4 strawberries  
 ¼ tsp. vanilla extract  
 \_\_\_\_\_ cup skim or low fat milk  
 \_\_\_\_\_ cup plain yogurt  
 \_\_\_\_\_ cup apple juice  
 \_\_\_\_\_ strawberries  
 \_\_\_\_\_ tsp. vanilla extract