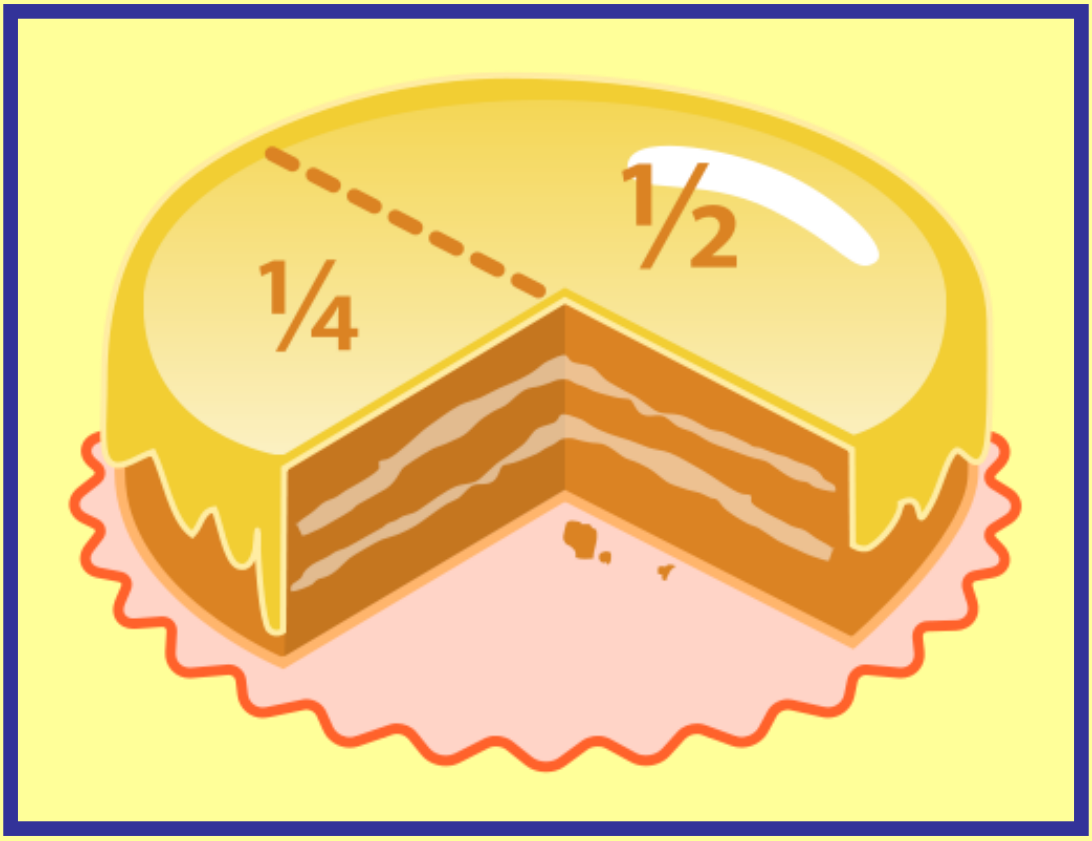
Fractions & Food

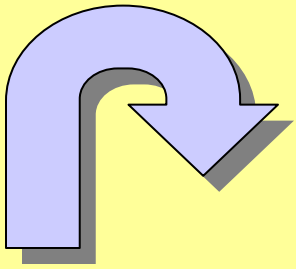
A guide to adding fractions with different denominators...



Instructor's Name: Danielle De Roos
School: Trinity Christian College
Intended Students: Sixth Grade
Topic: Adding Fractions with Different Denominators
Estimated Working Time: 45 minutes

INSTRUCTIONS: The purpose of this is to guide you through the process of **adding fractions with different denominators.** The exercise continues for several pages; it is important that you follow it step by step. You will need to know the following signs as you progress.

= Don't go any further



= Continue

One half…Three fourths…Six Eighths…what are they? They're fractions! A **fraction** describes a part of a whole when the whole is cut into equal parts. Fractions are the numbers between 0 and 1, or 1 and 2. They result from a division of a whole number.

By the end of today you will know how to:

- Find the least common denominator.
- Add fractions with different denominators.
- Solve story problems using fractions.
- Write answers in simplest form.

LET'S GET STARTED!!!

PRE-TEST

Write your answer in simplest form.

1.) What is 1/6 + 7/15? _____

2.) Laura made a fruit salad with 3/8 of a pound of melon and 1/4 of a pound of berries. How many pounds of fruit did Laura use in all? _____

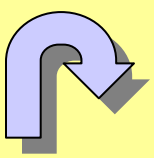
3.) Of the pies that Maximilian's Pie Shop sold last month, 2/6 were blueberry pies and 1/12 were blackberry pies. What fraction of the pies sold were either blueberry or blackberry? _____

4.) Christina made cookies. She used 1/2 of a cup of flour and 3/10 of a cup of sugar. How much more flour did Christina use than sugar? _____

5.) What is 4/6 + 1/4? _____

6.) Karla added 7/10 of a cup of walnuts to a batch of trail mix. Later, she added 1/2 of a cup of almonds. How many cups of nuts did Karla put in the trail mix in all? _____

7.) Antonio ate 5/8 of a pizza and Nicholas ate 1/2 of a pizza. How much more pizza did Antonio eat than Nicholas? _____



CHECK to see if you were right!!!

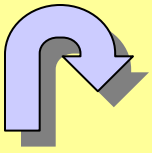
1.) 19/30
2.) 5/8 fruit
3.) 5/12 blueberry & blackberry pies
4.) 2/10 more flour
5.) 11/12
6.) 1 and 2/10
7.) 1/8 more pizza

If you got at least 6 of these problems right, you do not have to continue. For those of you who got less than 6 out of 7 continue you on and you will be able to correctly answer all of the final test questions!!

Let's Review: Remember that a fraction is a number that represents part of something that is whole.

7/10 of the pizza is left

The **numerator** is the top number and tells you how many parts of the whole you have out of the total number.
The **denominator** is the bottom number and tells you the total number of parts in the whole altogether!



Finding the Common Denominator

You **can't** add fractions with different denominators



1/3 + 1/6 = ?

So what do you do? How do you make them the same?
One simple answer is to multiply the current denominators together:

3 x 6 = 18

So instead of having 3 or 6 slices we will make them **both** have **18 slices.**
The pizzas would look like this:



6/18 + 3/18 = 9/18

Now that method works, but 18 is a lot of slices! Is there a way you can do it with fewer slices??? Here's a way that you could find out:

1st: List the multiples of both denominators.

1/3: List the multiples of 3: 3, 6, 9, 12, 15, 18, 21...
1/6: List the multiples of 6: 6, 12, 18, 24...

2nd: Find the smallest number that is the same.

Multiples of 3: 3, **6**, 9, 12, 15, 18, 21...
Multiples of 6: **6**, 12, 18, 24...

6 is the **LEAST COMMON MULTIPLE**

3rd: Change the denominators so they are the least common multiple.

***** Remember: Whatever you multiply on the bottom of the fraction you must also multiply on the top. *****

$$\frac{1 \times 2 = 2}{3 \times 2 = 6} \quad \frac{}{2/6}$$

$$\frac{1 \times 1 = 1}{6 \times 1 = 6} \quad \frac{}{1/6}$$

Now that both fractions have the same denominator it will be easy to add them together.

2/6 + 1/6 = 3/6



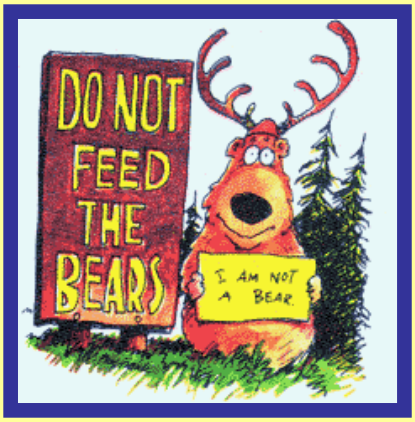
Try This:

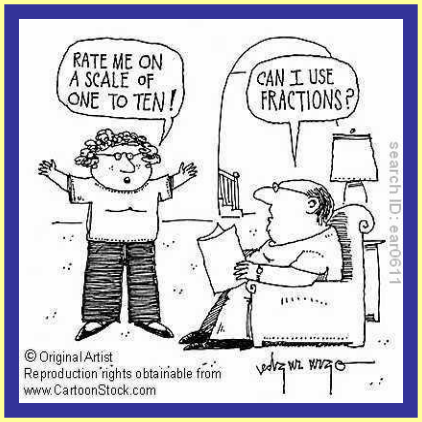
1. What number is the numerator in 16/20? _____
2. Find the Least Common Denominator of 3/4 and 6/8. _____
3. List the first 5 multiples of 6. _____
4. Find the Least Common Denominator of 4/5 and 1/2. _____
5. What number is the denominator in 8/10? _____

CHECK to see if you were right!!!

1. 16
2. 2
3. 6, 12, 18, 24, 36
4. 10
5. 10

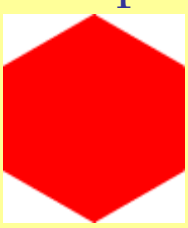
Good work so far! Before continuing, take a break.





Adding Fractions:

Let's cut up a hexagon into 6 pieces:



Each piece  is $\frac{1}{6}$ of the hexagon. Right?

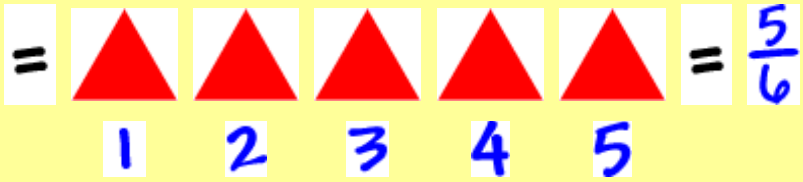
And  **is** $\frac{4}{6}$ **of the hexagon.**

So, what if we wanted to add

$$\frac{1}{6} + \frac{4}{6} ?$$

Hmm... that would be

Count them up



So $\frac{1}{6} + \frac{4}{6} = \frac{5}{6}$

Once the denominators are the same, adding is simple. You first add the numerators together just like you do with any other addition problem. Then you keep the same denominator on the bottom of the fraction. Let's practice!

1. 2/8 + 4/8 = _____

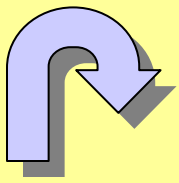
2. 2/5 + 1/5 = _____

3. 12/20 + 3/20 = _____

4. 6/10 + 2/10 = _____

CHECK to see if you were right!!!

1. 6/8
2. 3/5
3. 15/20
4. 8/10



Simplifying Fractions:

We reduce a fraction to lowest terms by finding an equivalent fraction in which the numerator and denominator are as small as possible. This means that there is no number, except 1, that can be divided evenly into both the numerator and the denominator. Try dividing both the top and bottom of the fraction until you can't go any further (try dividing by 2, 3, 5, 7... etc). Or you can find the GFC and divide both the numerator and denominator by that number. (GFC = Greatest Common Factor)

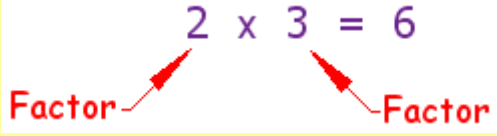
Greatest Common Factor is made up of three words

- Greatest,
- Common
- Factor

Let us start with the last word:

What is a Factor?

Factors are the numbers you multiply together to get another number:



Sometimes we want to find ALL the factors of a number:

The factors of 12 are **1,2,3,4,6** and **12** ...

... because **2** × **6** = 12, or **4** × **3** = 12, or **1** × **12** = 12.

What is a Common Factor?

Let us say you have worked out the factors of two or more numbers:

Example:

The factors of 12 are **1, 2, 3, 4, 6** and **12**
The factors of 30 are **1, 2, 3, 5, 6, 10, 15** and **30**

Then the ***common*** **factors** are those that are found in both numbers:

- Notice that **1,2,3** and **6** appear in both lists?
- So, the **common factors** of 12 and 30 are: **1, 2, 3** and **6**

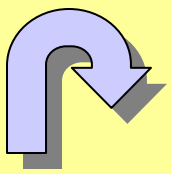
It is a *common* factor when it is a factor of two or more numbers.
(It is then "*common to*" those numbers.)

What is the "Greatest Common Factor" ?

It is simply the **largest** of the common factors.

Example: $\frac{20}{60}$ $\frac{20}{60} = \frac{20 \div 20}{60 \div 20} = \frac{1}{3}$

The GCF of 20 and 60 is 20.



Try This:

1. 4 x 3 = 12: Which number(s) is the factor? _____
2. What are the factors of 18? _____
3. What is the GCF of 15 and 30? _____
4. Simplify the following:
    a. 30/80 _____
    b. 6/10 _____
    c. 15/40 _____
    d. 6/8 _____

CHECK to see if you were right!!!

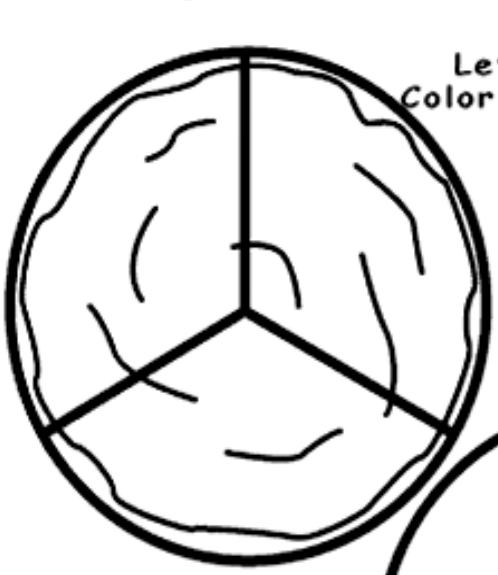
1. 3 & 4
2. 1, 2, 3, 6, 9, 18
3. 15
4. 3/8
5. 3/5
6. 5/8
7. 3/4

Awesome job! It's time to take another break. Color the parts of the cheeseburgers; you do not have to cut them out. These will be good manipulatives to help you when you're adding fractions together!

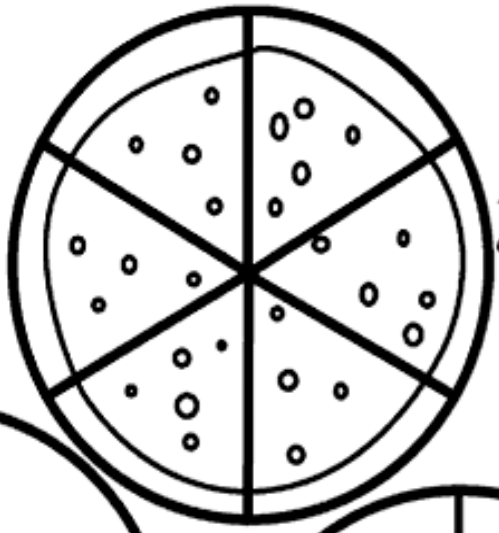
FRACTION CHEESEBURGER BUFFET

Directions:

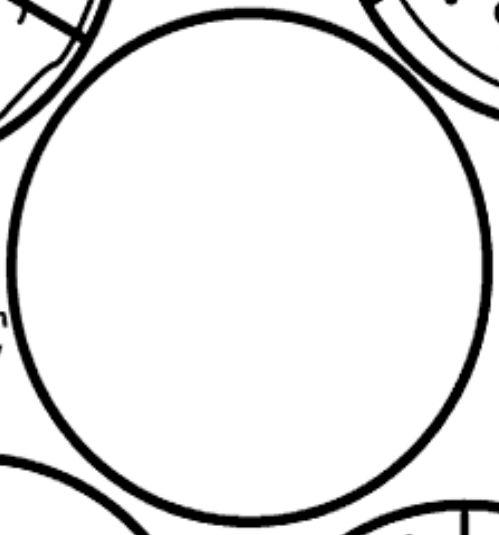
1. Cut out each circle. Color each piece of food.
2. Make many different combinations of cheeseburgers to help you learn fractions.
3. For example, take a whole bottom of bun, place 1/2 meat, 3/4 cheese, 1/3 lettuce, 5/6 tomato, and 5/8 top of bun, on top of each other.
4. Make up your own fraction combinations to serve different cheeseburgers in the buffet.



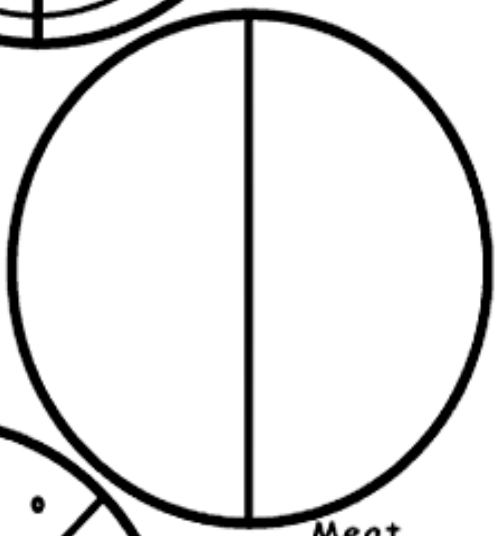
Lettuce
Color = Green



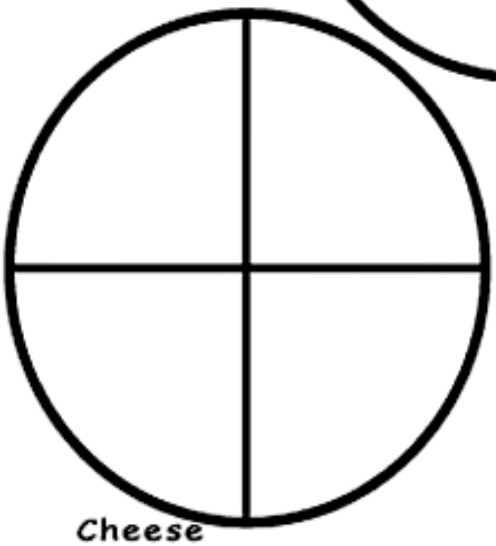
Tomato
Color = Red



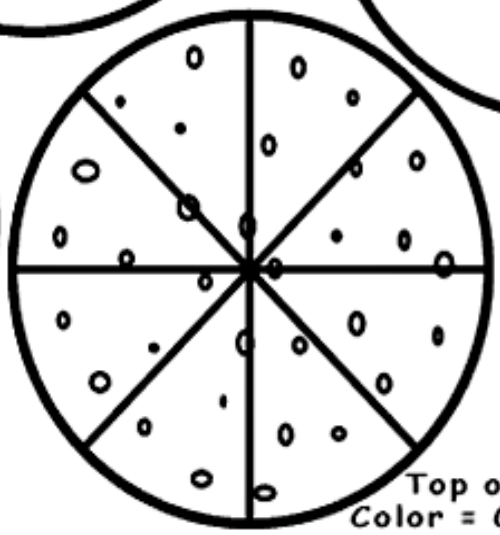
Bottom of Bun
Color = Yellow



Meat
Color = Brown

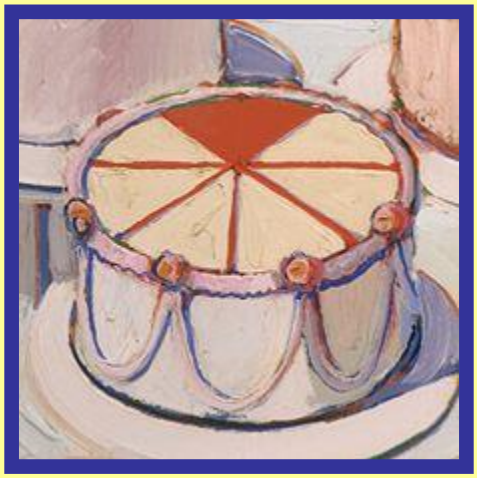


Cheese
Color = Orange



Top of Bun
Color = Goldenrod

Scenario #1: Frosting



There is a cake decorating show coming up and you need to make two very unique cakes. Both cakes are the same size; however you want to only frost 1/8 of one cake and 4/16 of the other. You need to know how much frosting to make so you don't make too much!

Let's Practice!

1.) Find the least common multiple of 1/8 + 4/16. This is done by listing the multiples of each denominator.
   a. Multiples of 8: _____
   b. Multiples of 36: _____

Which numbers are the same? The smallest number is the LCM!

The LCM is 2.

2.) Multiply both the numerator and the denominator by the LCM. Remember whatever you do to the top of the fraction, you must do to the bottom.

$$\frac{1 \times 2 = 2}{8 \times 2 = 16}$$

3.) Add the fractions together. 2/16 + 4/16 = _____

6/16

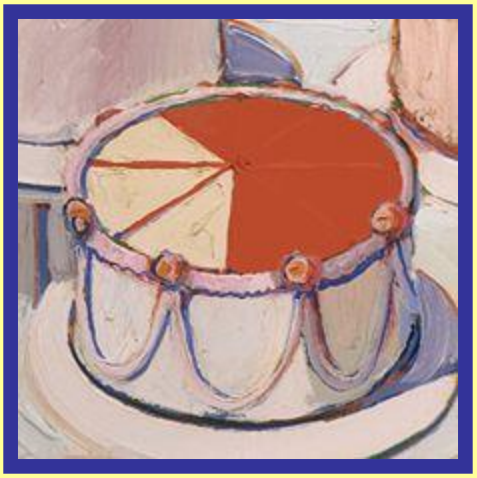
4.) Find the greatest common factor and simplify. This is done by first listing the factors of both the numerator and the denominator.
   a. The factors of 6 are: _____
   b. The factors of 16 are: _____

What is the Greatest Common Factor? _____

The largest number that it the same is the GCF. Divide the numerator and the denominator by the GCF and viola!!

$$\frac{6 \div 2 = 3}{16 \div 2 = 8}$$

Now are you ready to try it on your own??



At judging your cakes only got one critique; the first cake did not have enough frosting.
Both cakes are the same size again; however you want to frost 5/8 of the first cake and 1/5 of the second cake.

How much frosting do you need altogether?

CHECK to see if you were right!!!

1.) The LCM is 40
2.) Which changes the problem to 25/40 + 8/40
3.) When you add them together you get 33/40
4.) 33/40 is in simplest form

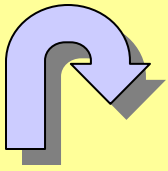
Scenario #2: Maximilian's Pie Shop

Maximilian's is known for several different kinds of pies. Their apple and pumpkin pies however are award winners! Of the pies that Maximilian's Pie Shop sold last month, 3/8 were apple pies and 5/12 were pumpkin pies.

What fraction of the pies sold were either apple or pumpkin?

CHECK to see if you were right!!!

1.) The LCM is 24
2.) Which changes the problem to 6/24 + 10/24
3.) When you add them together you get 16/24
4.) 2/3 is the simplest form (you can divide by 8)



Great Job!! We've done a lot of practicing so far. Now it's time for you to show off all you've learned. This post test will be no problem for you!!!

POST-TEST

Write your answer in simplest form.

1.) 3/4 + 1/8 = _____

2.) 7/16 + 1/2 = _____

3.) Sarah added 3/20 of a cup of walnuts to a batch of trail mix. Later, she added 1/5 of a cup of almonds. How many cups of nuts did Sarah put in the trail mix in all? _____

4.) Ernie ate 6/30 of a pizza and Bert ate 1/10 of a pizza. How much pizza did Ernie and Bert eat all together? _____

5.) 1/3 + 6/15 = _____

6.) Christina made cookies. She used 1/2 of a cup of flour and 3/10 of a cup of sugar. How much more flour did Christina use than sugar?
_____

7.) Billy made a fruit salad with 6/20 of a pound of melon and 10/80 of a pound of berries. How many pounds of fruit did Billy use in all?
_____

CHECK to see if you were right!!!

1.) 7/8
2.) 15/16
3.) 7/20
4.) 3/10
5.) 11/15
6.) 4/5
7.) 17/40

Awesome Job!! Way to add and simplify those fractions.
You are an expert now!!!!