



Fractions Made Visual

Unit Summary

Students learn the importance of math accuracy and, more specifically, that knowing how to add, subtract, multiply, and divide fractions makes life easier for everyone. To help students come to this understanding, they are assigned to a profession that uses fractions on the job. Their tasks are to research, summarize, draw conclusions, and report back on the importance of knowing fractions in the assigned professions and in their own lives either now or in the future.

Curriculum-Framing Questions

- **Essential Question**
Does accuracy really matter that much?
- **Unit Questions**
Are fractions important or would we be better off without them?
How are fractions used on the job and are they needed to get the job done right?
How can understanding fractions make your life easier?
- **Content Questions**
What is a fraction?
How do you add, subtract, multiply, and divide fractions?
What is the difference between a numerator and a denominator?
How do you change a mixed numeral into an improper fraction?

Assessment Processes

View how a variety of student-centered [assessments](#) are used in the Fractions Made Visual Unit Plan. These assessments help students and teachers set goals; monitor student progress; provide feedback; assess thinking, processes, performances, and products; and reflect on learning throughout the learning cycle.

Instructional Procedures

Introducing the Unit

Begin the unit by posting the Unit Question, *Are fractions important or would we be better off without them?*

Elicit students' initial responses and have them record their thoughts in their [math journals](#). During Week One of the unit, introduce fractions using the [fraction basics](#) teacher presentation. To help students understand fractions in a concrete way, involve them in a variety of hands-on experiences working with real-life fractions. Have them decorate cookies as fractional parts, divide paper cookies among friends, examine fractions in everyday life, and create their own fraction models. After each activity, allow students to take pictures of fractional parts for the class digital library, to be used in later projects. Take anecdotal notes while students are experimenting to document skills that may need reviewing before continuing the unit.

Pass out the [project rubric](#) and discuss unit requirements. Tell students you will be using this rubric to assess their work and understanding of mathematical concepts learned throughout the unit.

Creating and Publishing a Newsletter

During Week Two, involve students in more hands-on experiences dealing with fractions, notation, and equivalency. At the end of the week, divide students into groups and instruct each group to write about (summarize) one of these activities to publish in a [class newsletter](#). Pass out the [newsletter scoring guide](#) to help guide the process. Have students hold peer and teacher conferences to receive feedback on their writing. Instruct students to create an article heading,

At a Glance

Grade Level: 3-5

Subject: Math

Topics: Fractions

Higher-Order Thinking

Skills: Problem Solving,

Analysis, Investigation

Key Learnings: Fractions,

Problem Solving, Research

Techniques

Time Needed: 20 sessions,
45 minutes per session, plus
time for individuals and small
groups to work on computers

Things You Need

[Assessment](#)

[Standards](#)

[Resources](#)

paste in their edited writing, and add graphics or photos to the class newsletter template using publishing software. Publish the newsletter and then send it home to parents.

Presenting the Project Scenario

To help students understand the importance of fractions and how often fractions are used in life, students learn how various professions use fractions daily on the job.

Post the Unit Questions, *How are fractions used on the job and are they needed to get the job done right?* and *How can understanding fractions make your life easier?*

Have students write about the questions in their [math journals](#). Collect journals periodically throughout the unit to check for student understanding and redirect teaching as needed with the whole class or individually.

Inform students that they will discover the answers to these questions and the Unit Question presented earlier by taking on the role of a worker in a profession that uses fractions. Their task is to find out just how important fractions are to a profession and how the ability to work with fractions affects job performance. Finally, students must solve real-world fraction problems that relate in some way to their professions and draw conclusions about how the problems translate into their own lives.

Assign or allow students to choose a profession that uses fractions daily on the job. After each student has a profession, pass out the [student checklist](#), and discuss project requirements. Ensure that students understand the assigned tasks.

Researching and Collecting Information in a Variety of Ways

Before you set students to work researching their assigned professions, hold a discussion about effective ways to gather information about a topic. Ask students to brainstorm a list of ways to collect information and techniques for finding answers to questions. If an important research technique, such as conducting firsthand interviews, has not been suggested, make sure it is added to the list. After the list has been generated, discuss each technique. Point out how including information from multiple sources and using different research techniques adds validity and interest to a research project.

Provide students with a list of Web sites to use for researching their assigned professions as well as an electronic template or worksheet for collecting and recording information. The worksheet helps students organize their work for the upcoming presentations. In addition, demonstrate interview techniques and discuss the importance of collecting information from experts in the field. Together, generate a list of interview questions that might be important to ask an expert who can help address the project criteria and answer the Unit Questions. Discuss how e-mail can be used as an effective tool to communicate with experts. Remind students about etiquette and the rules they should follow to protect themselves when using the Internet and e-mail, even when conducting research.

Allow several days for students to conduct research and interviews with experts.

Drawing Conclusions and Making Connections Based on Research

After students have had plenty of time to gather and organize information about how fractions are used in their assigned professions, have them begin thinking about how fractions apply to them personally both now and in the future. Remind students that their presentations should answer the following Unit Questions:

- *Are fractions important or would we be better off without them?*
- *How are fractions used on the job and are they needed to get the job done right?*
- *How can understanding fractions make your life easier?*

Presentations should also include an answer to the bigger, Essential Question, *Does accuracy really matter that much?* Guide and assist students as necessary to make associations and draw conclusions. Hold student conferences throughout the research and project process to ensure students stay on track, get questions answered, and receive valuable feedback.

After students have established connections between their assigned professions and themselves, have each student come up with a real-world fraction problem that demonstrates the connection. Inform students that they need to state their real-world problems and show, step by step, how to solve them. As each student explains the process used to solve a problem, the student should address and include the answer to the following Content Questions:

- *What is a fraction?*
- *How do you add, subtract, multiply, and divide fractions?*
- *What is the difference between a numerator and a denominator?*
- *How do you change a mixed numeral into an improper fraction?*

Guide and assist students as needed, as they generate their problems and draw conclusions.

Creating Student Presentations

After students have collected their research information and generated real-world fraction problems associated with them, give students a storyboard form and instruct them to begin the process of creating their [multimedia presentations](#). First, have students visually plan their presentations by completing storyboards. Each storyboard should include slide titles and a bulleted list of key points.

Meet with the students individually as storyboards are completed to discuss the presentations and suggest any edits.

Once a student's storyboard has been approved, allow the student to begin creating slides. Guide and assist students as necessary as they create their presentations.

Delivering Oral Presentations

After students have had time to complete their presentations, have them break into pairs. Students in the pairs assist each other in delivering their individual oral presentations, with each taking a turn being the interviewer and the other the expert. Give students a period or two to come up with interview questions and practice presentations. The interviewer (student helper) asks the questions, and the expert (student presenter) responds to the questions using slides to support the talking points. Allot several days for students to present their projects. Facilitate a brief discussion following each presentation. Refer to the Essential and Unit Questions again, and ask students to use the information just presented to help respond to each of the following questions:

- *Does accuracy really matter that much?*
- *Are fractions important or would we be better off without them?*
- *How are fractions used on the job and are they needed to get the job done right?*
- *How can understanding fractions make your life easier?*

Record student responses on a chart.

After all of the presentations have been delivered, refer to the completed chart, and draw conclusions about the importance of fractions.

Creating a Wiki (Optional)

Throughout the unit, post daily riddles for students to solve using their fraction kits (or other manipulatives). If time allows, have students create their own riddles for others to solve. Divide students into small groups and ask them to create their own riddles. After a group creates a riddle, have the group build a [wiki](#)* that includes the riddle, a response form where visitors to the site can send in their answers, and finally an answer key that explains the solution to the riddle. Posting the riddles on a wiki allows students to publish their work and get feedback from other classrooms, parents, ePALS, and others, extending learning beyond the walls of the classroom.

Wrapping Up

Hold a class discussion around the Essential Question, *Does accuracy really matter that much?* Have students conduct a Pair and Share to discuss their answers and opinions to the Essential Question using examples from their research and project work. Do a partner swap and give students time to share with another peer. Take anecdotal notes as discussions take place, documenting students' understanding of the concepts learned throughout the unit. Have students record their ideas and opinions in their [math journals](#).

Prerequisite Skills

- Experience with electronic presentation and publishing software
- Experience with web browsing
- Exposure to fractions
- Knowledge of basic addition, subtraction, multiplication, and division principles

Differentiated Instruction

Resource Student

- Provide additional templates, manipulatives, and scaffolds

Gifted Student

- Have the student create a board game that involves math-related terminology and problem solving
- Have the student create a test or quiz for the class that is related to fractions

English Language Learner

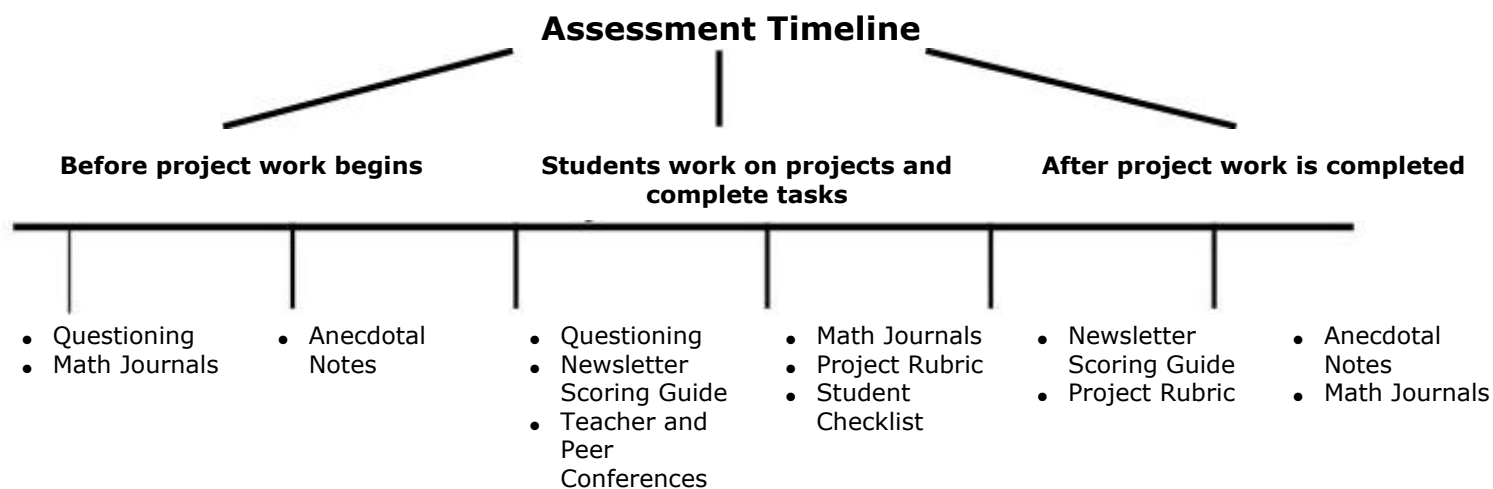
- Write simplified explanations of the student's real-world fraction problem
- Add math pictures and explanations to the student's card file of vocabulary words

Credits

David Frankle participated in the Intel® Teach Program, which resulted in this idea for a classroom project. A team of teachers expanded the plan into the example you see here.

Designing Effective Projects: Fractions Made Visual Assessment Plan

Assessment Plan



To informally assess students, use questioning, journal reviews, and anecdotal notes to monitor progress, provide feedback, and adjust instruction. Schedule student conferences to check on student progress periodically and offer feedback as needed.

Provide students with the [newsletter scoring guide](#) to guide and assess the newsletter article. Use teacher and peer conferences to offer individual feedback on the newsletter article before the final article is placed in the class newsletter. Give students the [student checklist](#) and the [project rubric](#) to help guide and assess the multimedia presentations. Use the same project rubric to assess the entire unit.

Designing Effective Projects: Fractions Made Visual

Content Standards and Objectives

Targeted Content Standards and Benchmarks

California Mathematics Standards for Grade 5

2.0 Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions:

2.3 Solve simple problems, including ones arising in concrete situations, involving the addition and subtraction of fractions and mixed numbers (like and unlike denominators of 20 or less), and express answers in the simplest form.

2.4 Understand the concept of multiplication and division of fractions.

2.5 Compute and perform simple multiplication and division of fractions and apply these procedures to solving problems.

National Educational Technology Standards

Technology productivity tools

- Students use technology tools to enhance learning, increase productivity, and promote creativity.
- Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.

Technology communications tools

- Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
- Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.

Technology research tools

- Students use technology to locate, evaluate, and collect information from a variety of sources.

Student Objectives

Students will be able to:

- Deliver "Ask the Expert" interviews and oral presentations that answer specific questions
- Use multimedia software to create slides to visually support oral presentations
- Understand how fractions are used in a variety of professions and how important accuracy is to the success of job tasks
- Use fractions to solve real-world problems
- Collaborate with a partner to write a newsletter article
- Work in teams to prepare an article for publication in a monthly newsletter
- Work in teams to create a fraction riddle, response form, and answer key to add to a wiki (optional)

Designing Effective Projects: Fractions Made Visual Resources

Materials and Resources

Supplies

- Hands-on fraction materials, including fraction kits, spinners, dice, tangrams, and pattern blocks to complete activities and investigations
- Partner grab, spinner, or other method to facilitate cooperative groupings

Internet Resources

- Cynthia Lanus: Lessons: Fraction Shapes
<http://math.rice.edu/~lanus/Patterns>*
Fun Mathematics Lessons: Pattern Block Fractions
- Math Challenge Lesson Plan: Fractions
www.libraryvideo.com/guides/K6448.pdf* (PDF; 2 pages)
Series that reinforces important skills taught in grades 4–6 through the use of animated characters and an engaging storyline
- National Library of Virtual Manipulatives for Interactive Mathematics: Numbers and Operators Grades 3–5
http://matti.usu.edu/nlvm/nav/category_g_2_t_1.html*
Interactive manipulatives for visualizing fractions
- Visual Fractions
www.visualfractions.com*
Tutorial that models fractions with number lines or circles
- Webmath.com: Solve Your Math Problem
www.webmath.com/k8if.htm*
Visual representation of a fraction
- Webmath.com: Solve Your Math Problem
www.webmath.com/k8cf.html*
Compare two fractions
- GetTech: Careers
www.gettech.org/category2.asp?cat=5*
Site to explore careers
- The Math Forum
<http://mathforum.com>*
A K-12 math information site
- Figure This! Math Challenges for Families
www.figurethis.org/index40.htm*
Math challenges for families with a teacher's corner and other resources
- The Math Forum: Ask Dr. Math™
<http://forum.swarthmore.edu/dr.math>*
Question and answer service for math students and their teachers

Technology—Hardware

- Computer for creating newsletters, creating multimedia presentations, and conducting research
- Digital camera for taking pictures of fraction representations
- Internet connection for conducting research and completing virtual activities
- Printer to print newsletters
- Projection system for showing multimedia presentations

Technology—Software

- Desktop publishing to create newsletters
- E-mail to converse with experts
- Internet web browser for conducting research, completing virtual activities, and creating the wiki
- Multimedia to create presentations

Fraction Newsletter Article Scoring Guide

Student _____ Date _____

	TOTAL VALUE	PEER ASSESSMENT	TEACHER ASSESSMENT
CONTENT			
<ul style="list-style-type: none"> • Clear summary of one of the fraction games or activities 	30		
<ul style="list-style-type: none"> • Appropriate use of math vocabulary from the unit (equivalent, denominator, and so on) 	10		
LAYOUT			
<ul style="list-style-type: none"> • Title and logo 	5		
<ul style="list-style-type: none"> • Article titles 	5		
<ul style="list-style-type: none"> • Graphics (support the text) 	5		
<ul style="list-style-type: none"> • Digital photographs 	5		
<ul style="list-style-type: none"> • Table of contents (accurately organizes publication) 	5		
<ul style="list-style-type: none"> • Quotation (enhances content of the article) 	15		
ORGANIZATION			
<ul style="list-style-type: none"> • Accurate spelling 	5		
<ul style="list-style-type: none"> • Proper grammar 	5		
<ul style="list-style-type: none"> • Visual attractiveness 	10		
TOTAL POINTS	100		
GRADE			

Reviewed by _____

Fractions Made Visual Presentation Checklist

Content	Comments:
_____ I used the storyboard planner to write a draft of my presentation.	
_____ I answered these questions: <input type="checkbox"/> Does accuracy really matter that much? <input type="checkbox"/> Are fractions important or would we be better off without them? <input type="checkbox"/> How are fractions used on the job and are they needed to get the job done right? <input type="checkbox"/> How can understanding fractions make my life easier?	
_____ I came up with a real-life problem and wrote detailed and clear procedures for solving the problem.	
_____ I answered these questions: <input type="checkbox"/> What is a fraction? <input type="checkbox"/> How do you add, subtract, multiply, and divide fractions? <input type="checkbox"/> What is the difference between a numerator and a denominator? <input type="checkbox"/> How do you change a mixed numeral into an improper fraction?	
_____ My visual representation helps my explanation.	
_____ I used correct mathematical terminology and notation.	
_____ I checked my presentation for spelling, grammar, and accuracy.	

Presentation

_____ My graphics help the audience's learning.

_____ My fonts and backgrounds add to the understanding of the problem or topic.

_____ My transitions and animations add to the understanding of the problem or topic.

Comments:

Fractions Made Visual Project Rubric

Criteria	4	3	2	1
Presentation Content	<p>Explanation of how fractions are used on the job and of the importance of accuracy to job performance is detailed and complete.</p> <p>All key points and conclusions are supported by research. Research has been gathered from a variety of sources as well as from experts in the field.</p> <p>Procedures used to arrive at the solution to the real-world fraction problem are detailed and clear, and include all of the steps required to solve the fraction problem.</p> <p>The Essential Question and all Unit Questions are addressed in the presentation and supported with research.</p> <p>Several Content Questions are addressed and thoroughly answered in the presentation.</p>	<p>Explanation of how fractions are used on the job and of the importance of accuracy to job performance is clear.</p> <p>Most key points and conclusions are supported by research. Research has been gathered from a variety of sources.</p> <p>Explanations of the real-world fraction problem and how knowing fractions helped to solve the problem are clear.</p> <p>The Essential Question and all Unit Questions are addressed and answered in the presentation. Most questions are supported with research.</p> <p>One or more Content Questions are addressed and thoroughly answered in the presentation.</p>	<p>Explanation of how fractions are used on the job and of the importance of accuracy to job performance is unclear but includes critical components.</p> <p>Some key points and conclusions are supported by research.</p> <p>Explanations of the real-world fraction problem and how knowing fractions helped to solve the problem are a little difficult to understand but include critical components.</p> <p>The Essential Question and all Unit Questions are addressed and answered in the presentation, but they are not adequately supported with research.</p> <p>One or more Content Questions are addressed in the presentation.</p>	<p>Explanation of how fractions are used on the job and of the importance of accuracy to job performance is difficult to understand and missing several components.</p> <p>Key points and conclusions are not supported by research.</p> <p>Explanations of the real-world fraction problem and how knowing fractions helped to solve the problem are difficult to understand and missing several components.</p> <p>The Essential Question or some Unit Questions have not been addressed or answered in the presentation. Research is lacking to support answers.</p> <p>Content Questions are not addressed or answered in the presentation.</p>
Mathematical Concepts	<p>Explanation shows complete understanding of the mathematical concepts used to solve the fraction problem.</p>	<p>Explanation shows substantial understanding of the mathematical concepts used to solve the fraction problem.</p>	<p>Explanation shows some understanding of the mathematical concepts needed to solve the problem.</p>	<p>Explanation shows very limited understanding of the underlying concepts needed to solve the problem.</p>
Graphs and Visuals	<p>Graphs, animation, and other visuals are clear and greatly add to the audience's understanding of the mathematical procedures used to solve the fraction problem.</p>	<p>Graphs, animation, and other visuals are clear and easy to understand.</p>	<p>Graphs, animation, and other visuals are somewhat difficult to understand.</p>	<p>Graphs, animation, and other visuals are difficult to understand or are not used.</p>
Mathematical Terminology and Notation	<p>Correct mathematical terminology and notation are always used, making the presentation easy to understand.</p>	<p>Correct mathematical terminology and notation are usually used, making the presentation fairly easy to understand.</p>	<p>Correct mathematical terminology and notation are used, but the presentation is sometimes hard to understand.</p>	<p>Mathematical terminology and notation are used inappropriately or in a very limited capacity.</p>

Oral Presentation	Presentation is interesting and well-rehearsed, with a smooth delivery that holds the audience's attention.	Presentation is relatively interesting and rehearsed, with a fairly smooth delivery that usually holds the audience's attention.	Delivery is not smooth but holds the audience's attention most of the time.	Delivery is not smooth, and the audience's attention is lost.
Newsletter Content	Summary of the fraction activity includes many details and examples. Assessment of the activity is insightful, original, and includes details to support the writer's editorial.	Summary of the fraction activity includes some details and examples. Assessment of the activity includes details to support the writer's editorial.	Summary of the fraction activity includes a few details or examples. Assessment of the activity is included but lacks details to support the writer's viewpoint.	Summary of the fraction activity includes few or no details and examples. Assessment of the activity is unclear, unsupported, or not included in the article.
Wiki Content	The site has a well-stated, clear purpose and includes a fraction riddle, response form, and answer key that work together to intrigue and motivate viewers to participate.	The site has a clearly stated purpose and includes a fraction riddle, response form, and answer key that work together to encourage viewers to participate.	The purpose of the site is somewhat vague but includes a fraction riddle, response form, and answer key.	The site lacks a purpose and is missing one or more of the required components.



My Fraction Journal

Name:

Date:

What I accomplished today:

What I learned about fractions today:

Questions I have:

Fraction Basics



1



$1/2$



$1/4$

Mr. Frankel
June 2004

What Is a Fraction?

A fraction names a piece of a single thing.

- This is **one-half** of a cookie.



A fraction names a part of a group of things.

- **One-third** or 1 out of 3 cookies are chocolate chip.



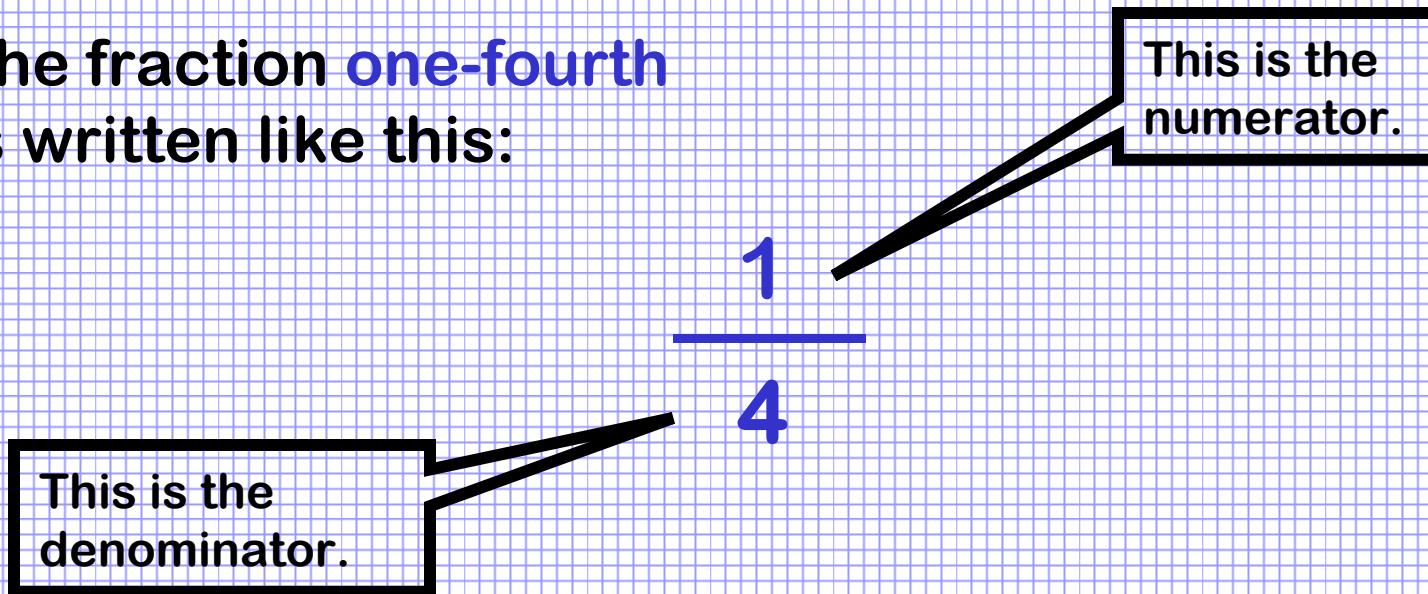
Fraction Notation

A fraction is a number used to name a part of a group or a part of a whole.

The number above the bar is the **numerator**.

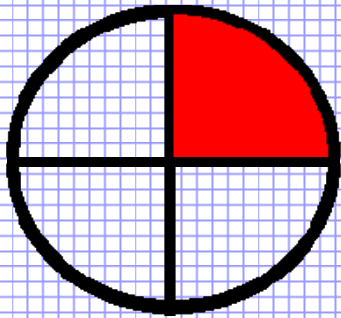
The number below the bar is the **denominator**.

The fraction **one-fourth** is written like this:



Fraction Models

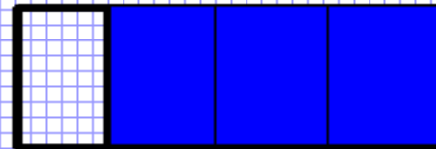
Fractions can be shown as parts of a circle



Here is $\frac{1}{4}$ of a circle.

1 out of 4 parts is shaded in, so we say **one-fourth**.

or as parts of a rectangle.



Here is $\frac{3}{4}$ of a rectangle.

3 out of 4 parts are shaded in, so we say **three-fourths**.

Fun with Fractions



Fractions With Cookies

-By: Shelley, Jill, & Tim

Last Tuesday, Mr. Frankel brought us a super treat... sugar cookies. There was a catch though. He said we couldn't eat them until we had frosted and decorated the fractional parts! First we drew a fraction plan showing what fractions we would divide our cookie into. Then we gathered frosting and sprinkles.



One whole sugar cookie

Some kids frosted fourths of their cookies - where each fourth was a different color. Some frosted one-half one color, one-third one color, and one-sixth another color.

Our cookies were almost too beautiful to eat.

This activity was really fun and easy. It really helped us to see, and understand fractional parts. It was a great introductory activity to help us explore the world of fractions. You can even try this one at

home next time you bake cookies. What a delicious way to focus on fractions!



A decorated half

Inside This Issue

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Cover Up by: Kylie, Trevor, & Joe

This week Mr. Frankel taught us a game called Cover Up.

In order to play, we first needed to make a fraction kit. The fraction kit looked like the one to the right.

Each strip was a different color.

Once everyone had their own fraction kit, we made fraction dice showing all the fractions in our kits. To play the game, you roll the dice

1							
1/2			1/4		1/4		
1/3		1/3			1/6	1/6	
1/6	1/6	1/6	1/6	1/12	1/12	1/12	1/12
1/4		1/8	1/8	1/8	1/8	1/8	1/8

Cover Up (continued)

and try to be the first to cover up your “whole” strip.

After we played Cover Up, we played Un Cover.

You start with two halves and uncover what you roll. But if you roll one-eighth, you have to trade one-half for four-eighths first.

We thought this game was really fun and creative.

Pizza Party

By Justin, Brittany, & Kelsey

As part of our fraction unit, our class learned to play Pizza Party.

Pizza Party comes in a real pizza box. You spin a pizza and try to be the first person to get a complete pizza. Sometimes you have to trade pieces. If you need one-sixth to complete your pizza and you spin a third, you can trade your third for two sixths. Then you win the game!

This was a fun game and, like Cover Up, it helped us to

We especially liked how you could play the game two ways, by covering or uncovering fractions depending on the roll of the dice.

Although this game doesn't teach you how to add, subtract, multiply, or divide fractions, it does force you to convert fractions and work with equivalent fractions,

understand equivalent fractions.

We highly recommend this game because we think it is a great way to practice fractions without feeling as if you are studying or doing math, even though you are.

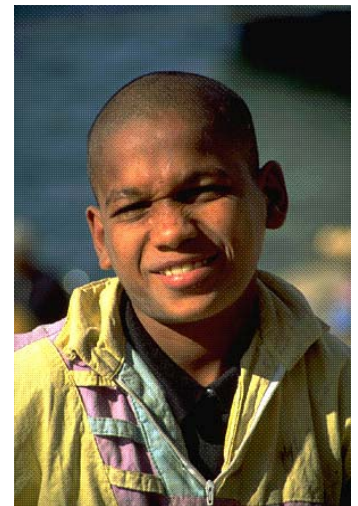
This game also helps you to see how fractions apply to everyday life, especially with food!

But, we must warn you that playing this game may make you hungry for a big pepperoni pizza!

which is something we all need practice at!

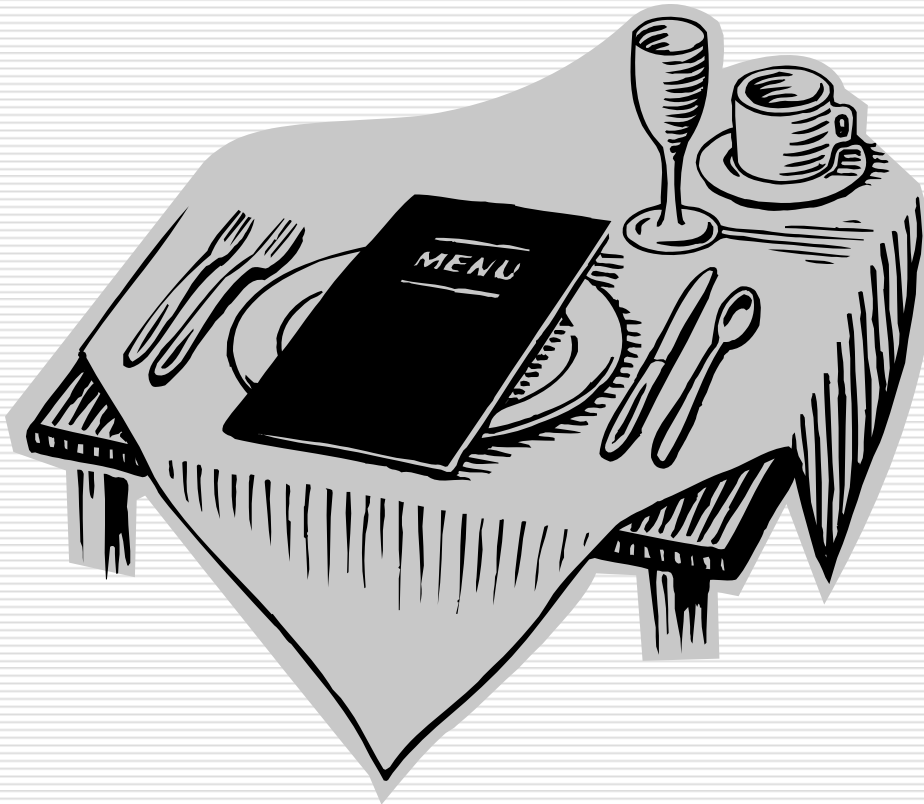


This game taught me equivalent fractions,” said Barbara.



*“This game is the bomb,” said Justin.
“The pizza slices really helped me to understand fractions.”*

Math on the Menu



By Lauren

Using Fractions on the Job

I am a chef, and I use fractions everyday on the job.

My job involves measuring. Most of the time, the things I must measure are fractional amounts, like $\frac{1}{2}$ teaspoon, $\frac{3}{4}$ tablespoon, or $2\frac{1}{3}$ cups.

Sometimes, I need to make more or less of something than usual, so I must add, subtract, multiply, or divide fractions to figure out the right amount to add or delete from a recipe.

In order for me to do my job right, I must understand how to work with fractions.

How Important Fractions Are to Getting My Job Done Right

If I don't measure correctly or figure out just how much of something I need to add into a mixture when I cook, then the food I make won't taste very good.

If my food doesn't taste good, I might lose my job or go out of business.

People who go to my restaurant count on the food tasting great. If I add too much flour or not enough salt, the food might turn out too dry or not flavorful enough.

So, if I want to be successful and do my job right, understanding fractions is really important.

How a Chef's Use of Fractions Relates to Me Personally

If I go to a restaurant and the chef doesn't understand fractions and gets the measurements all wrong, the food I order off the menu won't taste good.

If the food doesn't taste good, I won't eat much of it, and I will still be hungry. Not only that, but my parents will have wasted their money on bad-tasting food.

If the food doesn't taste very good, we won't go to that restaurant again.

Although the bad food probably won't hurt me, I won't be very happy.

How I Use Fractions Like a Chef

Although I probably won't be a chef when I grow up, I do like to bake cookies and help cook dinner.

When I help cook, I must use fractions too. Just like a chef, I need to know how to follow a recipe and measure ingredients that are in fractional parts.

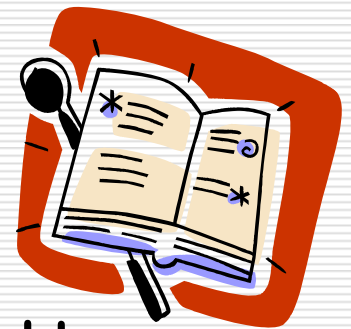
Sometimes, I must double or half a recipe too, which means knowing even more about fractions.

So, even though I am only 11 years old, I need to know how to deal with fractions if I want the food I cook to taste good, just like a real chef.

My Real-World Fraction Problem

A couple of weeks ago, I helped bake cookies for the school fair. We needed to double the recipe because we had to make 8 dozen cookies instead of just 4 dozen cookies.

To double the cookie recipe, I needed to know how to add, simplify, and change fractions.



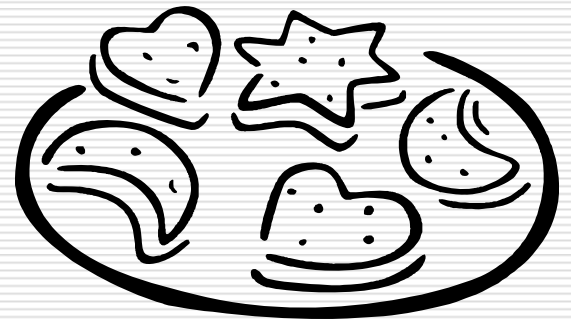
In order to make the cookies so they turned out just right, I had to solve a real-world fraction problem. I call my problem...Double Trouble.

Double Trouble

To **double** the recipe, I had to **add** 6 different fractions to figure out how much butter, sugar, water, vanilla, baking soda, and oats to put in.

$\frac{3}{4}$ cup butter
1 cup brown sugar
 $\frac{1}{2}$ cup sugar
1 egg
 $\frac{1}{4}$ cup water

$1 \frac{1}{2}$ tsps vanilla
1 cup flour
1 tsp salt
 $\frac{1}{2}$ tsp baking soda
 $2 \frac{3}{4}$ cups of oats



A fraction is a number used to name a part of a group or a part of a whole. The number above the bar is the **numerator**, and the number below the bar is the **denominator**.

Adding Fractions

To **add** the **fractions**, I had to have a **common denominator**, which meant the **bottom numbers** had to be the same.

That part was already done for me because doubling the recipe meant I just had to add the same number twice.

$\frac{3}{4}$ cup butter + $\frac{3}{4}$ cup butter

4 was my common denominator.

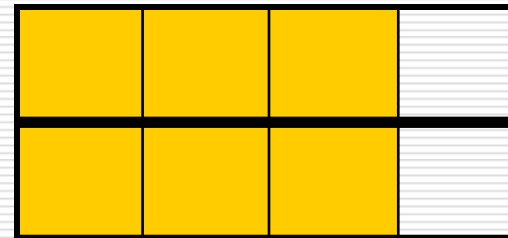


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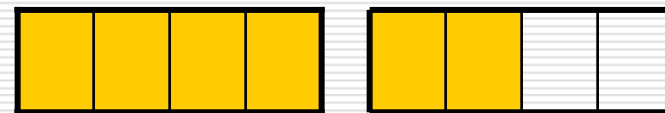


Once I had a common denominator, I had to **add** the **numerators** and keep the same denominator.

$$\begin{array}{r} \frac{3}{4} \text{ cup butter} \\ + \frac{3}{4} \text{ cup butter} \\ \hline \end{array}$$



$$\frac{6}{4} \text{ cups butter}$$



Simplifying Fractions

Since both **6** and **4** can be divided by **2**, my fraction could be reduced.

$$6 \div 2 = 3 \text{ and } 4 \div 2 = 2 \text{ which } = 3/2$$

Then I had to change it to a **mixed number**, because the numerator was bigger than the denominator.

$$3 \div 2 = 1\frac{1}{2}$$

So I needed **1½** cups of butter

Problem Solved!

Because I knew how to **add, simplify, and change fractions**, I was able to **double** all of the **fractions** in the recipe.

$\frac{3}{4}$ cup shortening

$$\frac{3}{4} + \frac{3}{4} = \frac{6}{4} \text{ or } \frac{3}{2} = 1 \frac{1}{2} \text{ cups}$$

$\frac{1}{2}$ cup sugar

$$\frac{1}{2} + \frac{1}{2} = \frac{2}{2} \text{ or } \frac{1}{1} = 1 \text{ cup}$$

$\frac{1}{4}$ cup water

$$\frac{1}{4} + \frac{1}{4} = \frac{2}{4} \text{ or } \frac{1}{2} = \frac{1}{2} \text{ cup}$$

1 $\frac{1}{2}$ tsps vanilla

$$\frac{3}{2} + \frac{3}{2} = \frac{6}{2} \text{ or } \frac{3}{1} = 3 \text{ tsps}$$

$\frac{1}{2}$ tsp baking soda

$$\frac{1}{2} + \frac{1}{2} = \frac{2}{2} \text{ or } \frac{1}{1} = 1 \text{ tsp}$$

2 $\frac{3}{4}$ cups of oats

$$2\frac{3}{4} + 2\frac{3}{4} = \frac{11}{4} + \frac{11}{4} = \frac{22}{4} \text{ or } \frac{11}{2} = 5 \frac{1}{2} \text{ cups}$$

Math on the Menu Conclusions

I learned that knowing how to do math and understanding fractions is really important and that many people need to know fractions in order to do their jobs.

Chefs need to know fractions so that they can bake and prepare items on a restaurant menu.

Chefs must also know how to double, triple, and sometimes half measurements on recipes. This means they need to understand fractions.

If I want to bake or cook something, I need to know how to work with fractions too.

Knowing Fractions Makes My Life Easier

It helps ME to figure out ...

- How to double a recipe when I cook
- What “quarter to four” means
- How much taller I’ve really grown when it is not quite a whole inch

Even though I don’t plan to be a chef when I grow up, I may have a job that will require me to use fractions too!
