Teaching Third Graders about Fractions through Problem Solving

Kathleen Gormley

Introduction

"One of the most important tasks of the teacher is to help his (or her) students." [1] As I began my research for this unit, I came across this quote and thought well, of course. Then I began to really think about what this means, what is the best way to help my students? I've adopted the belief that one of the best ways to help my students in mathematics instruction is to teach them how to think holistically about mathematics. The "drill and kill" strategy or the "sage on the stage" experiences just don't cut it in my classroom. This unit will focus on problem solving strategies for third graders and how to implement those strategies to work with fractions. As the Common Core State Standards for Mathematics begin to focus our instruction, this unit will help to develop understanding and resources to effectively use the standards in my classroom.

Demographics

The Red Clay Consolidated School District is located in Northern New Castle County, Delaware with a combination of urban and suburban settings. Some of its elementary schools are located in the heart of the largest city in the state. The district is comprised of 28 schools with approximately 1000 teachers. It services over 16,000 students. Of those students, 27% are African American, 4% are Asian, 20% are Hispanic, and 49% are White. Students' needs vary, with almost 15% receiving Special Education Services and 10% receiving English Language support. In addition, 41% of the students come from families with low incomes.

Highlands Elementary is an urban school in the city of Wilmington, Delaware. We are a small K-5 school with an enrollment of an average of 320 students. Eighty-six percent of our student make-up is represented by ethnic minority populations while 82% of the students fall into the classification of low socio-economic status. I am a third grade teacher with a class size varying between 24-28 students which are representative of the make-up of the school. Recently I have been designated as an inclusion teacher. I collaborate with Special Education teachers who come in to assist during the English/Language Arts block and during Mathematics instruction. I am the primary teacher responsible for instruction of all, general education and special education, students for all other subjects.

Rationale

When you say you are developing a unit on problem solving, many teachers think that the unit will include old fashion, customary word problems involving trains traveling from different cities and different speeds. In some minds, problem solving is synonymous with word problems. I am hoping that this unit dispels that interpretation. I intend to create and use rich, real-life problems to focus my instruction on the conceptual development of my students regarding fractions. Problems will be chosen for their ability to encourage my students to reason with mathematical concepts, represent their thinking, evaluate their solutions, and justify their decisions. Now that fractions have become such a large part of the Common Core State Standards in Mathematics (CCSM) for third graders, I have to become proficient in how to successfully teach these concepts to my students. Not only do I have to have a firm grasp on the concepts myself, I must know what misconceptions my students may develop and how I can help them overcome them. Up until this point in their learning, students have been working primarily with whole numbers. When they begin to work with fractions, they use this prior knowledge and wrongly make assumptions about fractions. Additionally, it is not uncommon to hear people saying things like, I'll take the bigger half. This leads to confusion since fractions are made up of equal parts. I would like my students to develop a strong conceptual foundation that helps them to reason about the magnitude of fractions which will aid them as they move forward with adding and multiplying fractions. Developing differentiated lessons and using an assortment of models will help students to acquire a more accurate understanding of fractions.

Getting students ready to begin a new mathematical concept involves activating prior knowledge so students can make connections between themselves and the concept. This helps students develop a context, or gives the teacher valuable information about what students already know or do not know. Explicit vocabulary instruction is essential for mathematical success. In my classroom, I strive to be as precise as possible. In my experience in other seminars through the Delaware Teachers Institute, teachers from middle school and high school mathematics have expressed frustration with some of the "cute" names elementary teachers assign to mathematical concepts. I no longer speak of translations with the terms of "flips, slides, and turns" due to the misconceptions these can lead to as the concepts develop.

Problem Solving Strategies

Math Problem Solving Circles

I had a big ah-ha moment as I wrote this unit. I frequently use literature circles in my English/Language Arts classes. Literature circles are an excellent strategy that infuses student centered inquiry with collaborative learning. Using this strategy encourages students to take responsibility for their learning based on the plan and choices they make. Students choose their own reading materials, lead the discussion, and engage with the texts and each other in a positive, authentic way. Why can't we create the same experience in math class?

I have now developed Math Problem Solving Circles, see Appendix F, where small groups of students engage with a problem and have designated roles that will help students to make sense of the problem, facilitate discourse, and decide which tools or strategies to use to help solve the problem. I create student groups of 3 to 4 students, then present the problem, and assign roles. I have develop four roles to best suit my classroom needs, they are; Reporter, Questioner, Strategizer, and Reflector. Each role has a purpose, yet the purpose is not to isolate the problem into pieces, the purpose is to provide all students the opportunity to access a problem, comprehend what the problems is asking, discuss a variety of possible strategies, and make connections to other mathematical concepts. The following descriptions provide a starting point and have suggestions for students' engagement. Students will be using a KWCSA chart while participating in a Math Problem Solving Circle and this chart is explained in detail below.

REPORTER: The reporter's role is to read the problem to the group and to fill in the "What do we KNOW" portion of the chart. The reporter will also lead the groups presentation to the rest of the class.

QUESTIONER: the questioner's role is to lead a discussion about what the problem is asking, what needs to be solved. The questioner should fill in the "What do we WANT to know" portion of the chart. The questioner should be asking throughout the process, does this solution make sense? Are we solving the question the problem is asking? Have we used the correct units? Do we need more information? Have we ever solved a problem like this before?

STRATEGIZER: the strategizer's role is to lead the discussion about which strategies would be most efficient to solve the problem. The strategizer should fill in the "What STRATEGIES we I use?" portion of the chart. They will help to ensure that group members are using a variety of strategies.

REFLECTOR: the reflector's role is to lead the discussion about following the plan the group is setting up and to think about its efficacy. Some questions the reflector can ask the group are; Will this plan help find a solution to the problem? Is there another way we could solve this problem? If there are multiple ways to solve the problem is one way better than the other? The reflector should fill in the "What is the ANSWER?" section of the chart. After the problem is solved, the reflector will help lead the discussion about what each group member learned and how this new information can be used again by asking questions like, What have we learned? How can we use this information again? I believe this type of approach to problem solving will enable more students to become successful as they tap into their collective knowledge. I believe a barrier to problem solving for many students is the lack of experience and the issue for students of not knowing where to start.

Problem Solving Process

In my experience, when I talk about problem solving, many of my colleagues think I am speaking of word problems. I take a minute to explain to them the difference; word problems are math exercises that embed numeric equations into a variety of questions, and problem solving involves implicitly teaching students strategies to solve a variety of problems. There are a set of steps that students need to follow in order to become successful when they begin the problem solving process.

In my classroom, I have found that there are seven strategies that are appropriate and useful to my students: draw a picture, look for patterns, make a chart or graph, guess and check, work backwards, make a list, choose an operation. Each strategy is introduced along with several problems that lend themselves to that specific strategy. I also provide my students with a graphic organizer to help them organize and make sense of the problems. I am not a big fan of teaching key words because there are always a few problems that do not fit the key word rules and I think this also teaches students to focus on a set of words and not to think holistically of the problem.

Understand the Question: students need to read the questions carefully and develop an understanding of what the question is asking. Many misconceptions and errors began when students answer a different question than what was being asked.

Choose a Plan: as students begin to work with the problem, they need to decide which strategy will best aid them.

Try your Plan: this is the place in the problem solving process that students put their ideas into action. They are thinking about each step as they proceed and continue or make changes if necessary.

Check your Answer: Once students come to a solution they need to ensure their response is accurate. They should ask themselves some questions to guide their thinking. Did you answer the question that was asked? Does your answer make sense? Did you remember to use the correct units? Then they should redo the problem another way and try to get the same answer and check your math work for small errors. After the solution has been determined students should then, Reflect: Think about what you have done and what you have learned. Also, students should ask themselves if there is anything they are still confused about.

Understanding the Problem using a KWCSA

Using the Standards for Mathematical Practice as a guide, I have worked to develop strategies that aid my students as they make sense of problems and persevere in solving them. My students use a revised KWL form specifically adapted to help in my math classroom. We call the graphic organizer a KWCSA chart. The K section asks students, What do you KNOW about the problem? This enables students to clarify the information within the problem and provides them a place to record information they will need to solve the problem. They must also make decisions to justify what information is needed to solve the problem and what information is superfluous. The W section asks students, What do I WANT to find out? Many times my students get confused as to what they are actually being asked in the problem and this gives them a place to write it down and focus on what they are solving. The C section asks students; Are there any CONDITIONS, rules or tricks I need to look out for? The S section asks students to list two to three STRATEGIES that they believe will help them solve this problem. Multiple strategies are listed so students know if one strategy is not working they can try another. The A section is the place where students record their ANSWER. I was finding that many of my students would work hard to solve a problem and then never finalize their work. This space reminds them to refer back to the W section and make sure they have answered the question they were asked.

Connections

Having students make connections will improve their understanding and use of the correct terminology. Students can make a variety of connections; math-to-self, math-to-world, math-to-math. Math-to-Math connections encourage students to connect prior knowledge and experience to the current concept. They should ask themselves what does this problem remind me of? Have I ever worked on a problem similar to this one? Math-to-World connections have students thinking about events, the environment, and natural or created structures. Students could ask themselves, is this problem related to any other type of problem I have seen? Who would use this type of math? Have I seen anything like this on TV or in the movies? Math-to-Self connections help students use personal experiences to understand the problem. Students could ask themselves, Where would I use this problem? Is there a tricky part that I need to thing about? What do I already know?

Vocabulary

A good definition should be unambiguous and should allow students to test and check whether an object or situation fits the definition. In terms of fractions, many individuals make statements such as, “I’ll take the bigger half.” This leads to the misconception that fractions are merely pieces of a whole and do not have to be equal. During vocabulary introduction, I will use strategies that are successful in other content areas in my classroom. Students will make a self-analysis based on their understanding and comfort with a word and place their information onto a class data table. Students will choose from the following options; “I would like to learn this word”, “I have seen this word but I am not sure of its definition”, and “I know this word and I can use it accurately”. After each student adds their information to the table, we discuss the data set of the class and move forward with learning more about the term.

History of Fractions

Examples of the use of fractions can be traced to ancient Egyptians, Babylonians, and Greeks. Fractions were used as civilizations grew and needed ways to measure merchandise and goods. Additionally, fractions were used as people studied nature. Fractions were used in Greek astronomy, architecture and music theory for describing musical intervals and the harmonic progression of string lengths.

Fractions

Examining the CCSM shows us that students need to understand that a fraction is a quantity formed when a whole is divided into equal parts. The numerator is the number that is places above the fraction bar and represents the number of equal parts. The denominator is the number placed below the fraction bar and indicates how many of the equal parts make up the whole unit. Fractions can be represented in a variety of ways and there are four that are most prevalent in my classroom. They are the area model, a shape is partitioned into equal pieces, the set model, in which the set of given objects is the whole and the number line model, which involves students locating a fraction on a number line, and measurement. It is important that teachers utilize a variety of models, not just circles or rectangles, and number lines to show fractions. Students need to partition these shapes themselves and be able to justify that the partitions are equal. Initially the use of grid paper will give students a concrete representation for the area model. Teachers should not limit themselves to using just shapes that are consistently partitioned based on the unit fraction, they are encouraged to use partitioned shapes that do not correspond to the faction. The key to understanding fractions is to understand the size of the whole. If I eat half of a cookie and you eat half of a pie, who has eaten more? I am hoping that the first question my students ask would be; “Well what is the size of each?” A key concept that needs to be emphasized is that fractions always represent some type of whole quantity. The size of the whole determines the size of the fractions.

Area Model

Students and teachers are most familiar with expressing fractions using this model. This primarily consists of a shape which is classified as the whole. As equal partitions are made fractions come to life. One way to understand fractions using this model is to provide a given whole in a variety of shapes and sizes and have students divide the model into equal pieces. Students can also develop understanding of this model through addition or subtraction tasks. An example would be; Norman and Tim shared a pizza. If Norman ate 3/8 of the pizza, how much did Tim eat? Also you could use a comparison task to comprehend fractions, Sophie and Ella are both celebrating their birthday and have identical cakes. Sophie and her guest ate 6/8 of her cake while Ella and her guests ate 3/5. Which girl had more of her cake consumed?

Set Model

Using the set model can lead to many confusions for students. In this model, there is a set of objects. The objects, or set is what is being divided into equal pieces. Students can practice using addition or subtraction tasks similar to this one; there are 24 students in Mrs. Feely's class. They can choose to use a green pencil, a red, pencil, or a blue pencil. Half of the students chose the green pencil and 1/3 chose the red pencil. How many students are using a blue pencil? A comparison task would develop the understanding also; In Mr. Poliak's class there are 20 students. Half of the students are girls. In Miss Gormley's class there are 24 students. One-third of the students are girls. Which class has more girls?

Number Lines

Using a number line to understand that a fraction is a number is another part of the standards that students must become proficient. When using the number lines to improve understanding, use a variety of models with beginning points at other numbers than zero and ending points at other numbers than one. Students should be exposed to equations similar to ½ + ¼ . Also, students should work on comparison task on the number line, for example; which number is greater 2/5 or 3/8?

Measurement

Fractions play a big part in understanding measurement. Whether students are measuring using linear measurement, volume measurements, or time measurements, an understanding of fractions is important. Students will build understanding by working on addition or subtraction tasks; Amy was making bracelets that were 6 inches long. Two-sixths of the bracelet was pink ribbon, 1/6 of the bracelet was white ribbon. The rest was yellow ribbon, how much of the bracelet was yellow ribbon?

CCSM Critical Areas

According to the Common Core State Standards for Mathematics, there are four critical areas in third grade that instructional time should focus on, one of those critical area deals with developing understanding of fractions, especially unit fractions (fractions with a numerator of one). Third graders frequently have difficulty with the concept of fractions. Many times they do not think of fractions as a number; some think of them as symbols. Fractions force them to alter their preconceived understandings about number as they dissect the pieces to try to interpret the meaning, such as incorrectly deciding that if 6 is larger than 4 then 1/6 must be larger than 1/4.

Some strategies to help students to develop fraction sense may include working with fractions that have the same denominators. If students compare 2/6 and 5/6 of the same model, they will observe the fraction size is the same then students can focus on the number of parts. Working with fractions with the same numerator, if students compare 2/6 and 2/4 they will see both fractions have the same number of parts yet the size of the parts is different. Students will need to work with benchmark units of one-half or one whole and compare fractions to these benchmarks. If students compare 5/6 and 6/5 and study the relationship to one whole unit they can focus on the overall size of the fraction.

Teaching Strategies

Small Groups and Centers

Small groups and centers allow me the opportunity to differentiate the learning process and provide remediation to some students and enrichment to others. I try to commit one day a week to this strategy as it allows students the chance to apply and practice skills. Centers should provide meaningful, independent work for the students and should be open-ended in order to provide students with multiple entry points and solutions. It is important to set up routines in order to build independence and insure engagement.

Gallery Walks

Students will work in groups of 3 or 4 and will be presented with a problem to solve. The problems should be written at the top of large poster paper. Place the posters around the room. Students work together to solve the problem. After a designated time period, depending on the difficulty of the problems I go for about 5 to 10 minutes, groups move to another poster. Students review the previous solution and then solve the problem using a different strategy. I usually allow for 3 rotations and then groups will present the problems to the class and a discussion will take place about the variety of strategies.

Lesson 1 Fraction Vocabulary

Essential Question: What is the importance of vocabulary? What is a numerator? What is a denominator?

Enduring Understanding: Students will be able use an interactive journal to record definitions and create an illustration to depict terms.

Procedure:

Students will use their math journals to create vocabulary definitions with illustrations and examples to aid in the understanding of the terms. When using an interactive journal, students will create a flap book styled entry, see Appendix C. Students will fold the paper in half and glue the back portion into their journal. The top portion will be cut along the lines. The vocabulary word will be on the top flap. Students will write the definition, illustrate the definition, and give any examples of the definition that will aid in their understanding under the corresponding flap.

Assessment: Accurate completion of the task will enable students to use this product as a study aid. The task will be used as an informal, formative assessment.

Lesson 2 Comparing Fractions

Essential Question: What matters more when determining the size of a fraction, the numerator or the denominator?

Enduring Understanding: Students will be able to compare two fractions with the same numerator or the same denominator and reason about their size.

Procedure: Students will create a set of fraction flashcards naming a fraction and creating an illustration of the fraction. They will then play a version of the card game "war". Students will have cards facedown. They will turnover one card each at the same time. Students will determine which fraction card is larger and justify who wins the round and why. Play will continue until one student has won all of the cards.

Lesson 3 Recipe for Fractions

Essential Question: How do we use fractions in our everyday life?

Enduring Understanding: Students will be able to look at a recipe that utilizes fractions and extend the measurements.

Procedure: Students will be given recipe cards, see Appendix E, and will follow the directions on each card.

Assessment: As students create the solutions on the task cards, the will record their answer. These recording sheets will be used as an informal assessment.

Appendix A

Pre-test/ Post-test

Name:

1. John and Oliver were sharing a candy bar. John ate 1/3 of it. How much did Oliver get?

2. Paul and Kelly were eating pizza. Paul said he ate 2/8 of the pizza and Kelly said she ate ¾ of the pizza. Did they eat the whole pizza? Who ate more pizza?

3. Naria and Miro were reading the same book. Naria read 2/5 of the chapters Miro read 2/6 of the chapters. Who read more?

4. The 24 students in Mr. Camac's class could choose to play soccer, football, or tennis. They could only choose one sport. Twelve students choose to play soccer, 8 chose to play football, and the rest chose tennis. How many students chose tennis? What fraction of the class chose each sport?

5. Using the number line, solve the equation ½ + ¼ =?

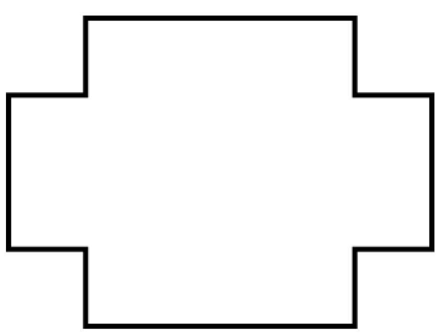
●--●

0 1

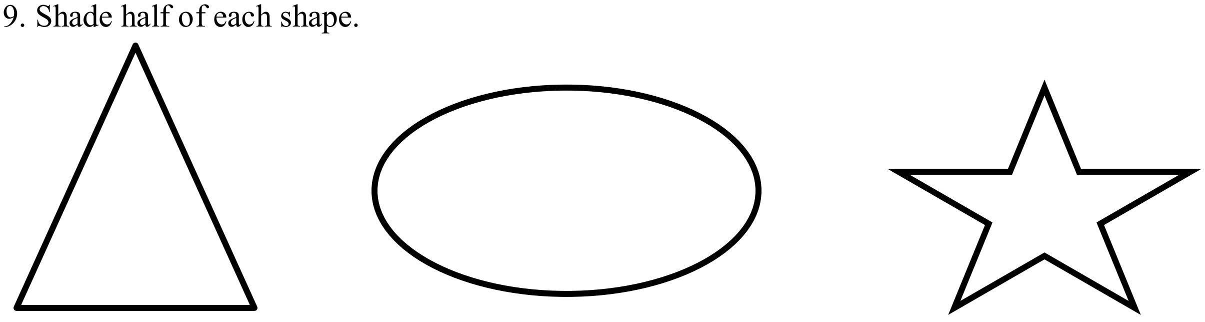
6. Chris, Ellie, and Ken were blowing up balloons for a party. They blew up 12 balloons. If they each blew up the same amount, what fraction did each person blow up? How many balloons did each person blow up?

7. Sara has 15 apples in her basket 2/3 are green and the rest are red. How many are green? How many are red?

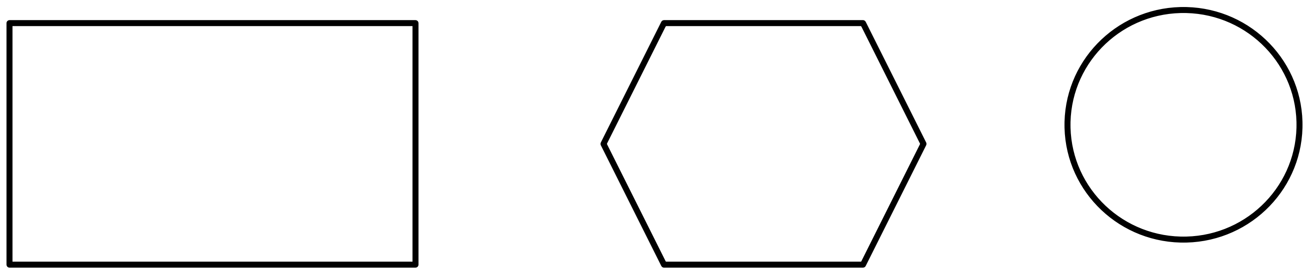
8. Shade in ¼ of the shape.



9. Shade half of each shape.



10. Shade 1/3 of each shape.



Appendix B

Ten Essential Strategies for Supporting Fraction Sense

Strategy 1: Provide opportunities for students to work with irregularly partitioned and unpartitioned, areas, lengths, and number lines.

Strategy 2: Provide opportunities for students to investigate, assess, and refine mathematical “rules” and generalizations.

Strategy 3: Provide opportunities for students to recognize equivalent fractions as different ways to name to same quantity.

Strategy 4: Provide opportunities for students to work with changing units.

Strategy 5: Provide opportunities for students to develop their understanding of the importance of context in fraction comparison tasks.

Strategy 6: Provide opportunities for students to translate between fraction and decimal notation.

Strategy7: Provide opportunities for students to translate between different fraction representations.

Strategy 8: Provide students with multiple strategies for comparing and reasoning about fractions.

Strategy 9: Provide opportunities for students to engage in mathematical discourse and share and discuss their mathematical ideas, even those that may not be fully formed or completely accurate.

Strategy 10: Provide opportunities for students to build on their reasoning and sense-making skills about fractions by working with a variety of manipulatives and tools, such as Cuisenaire rods, Pattern blocks, fraction kits, and ordinary items from their lives.[2]

Appendix C

fraction	numerator	denominator	interval

unit fraction	equivalent fraction	number line	end point

halves	thirds	fourths	sixths

Appendix D

Vocabulary List

Name:	
Term	Definition
partition	
equal parts	
fraction	
equivalent	
equivalence	
reasonable	
denominator	
numerator	
partition	
unit fraction	

interval	
number line	
endpoint	
compare	
less than (<)	
greater than (>)	
equal to(=)	
justify	
halves	
thirds	
fourths	
fifths	
sixths	

Appendix E

Recipe Cards

Task Card 1

1/2 cup cocoa
2 cups granulated sugar
1/4 cup milk
1/2 cup butter
1 teaspoons vanilla extract
1 cup flaked coconut
3 cups quick-cooking rolled oats

This recipe makes 24 cookies. How much of each ingredient would you need to make 48 cookies?

Task Card 2

½ cup honey
½ cup peanut butter
1 cup nonfat dry milk
1 cup quick cooking oats

I could only find a ¼ cup measuring cup. How many times would I need to use this cup for each ingredient?

Task Card 3

1 cup granulated sugar
1/4 cup margarine
1/3 cup evaporated milk
1/4 cup peanut butter
1 cup rolled oats
1/2 cup chopped peanuts (salted)
1/2 pound M&M's candies
1/2 teaspoons vanilla extract

If you want to make three batches of this recipe, how much of each ingredient will you need?

Task 4

2 cups sugar
1 cup cocoa
1/2 cup milk
1/4 cup butter
1/2 cup peanut butter
2 cups oatmeal

This recipe makes 24 cookies. How much of each ingredient will I need if I only want to make 12 cookies?

Task 5

1 cup melted butter
1/3 cup sugar
1 cup brown sugar
2 cups graham cracker crumbs
1/2 cup milk
1/2 cup chocolate chips
1/2 cup butterscotch chips
2/3 cup peanut butter

If you want to make four batches of these cookies, how much of each ingredient will you need?

Task 6

1/4 cup cocoa
2 cups rolled oats
1/4 cup chopped peanuts
1/8 cup vanilla

This recipe makes 2 1/2 dozen cookies. How much of each ingredient will I need to make 7 1/2 dozen cookies?

Appendix F

Math Problem Solving Circles

Create student groups of 3 to 4 students. Present the problem and assign jobs.

Jobs: Reporter, Questioner, Strategizer, Reflector

Reporter:

- Before: Discuss what we know about the problem. What are the variables?
- After: Reports the group's solution and reflections to the class.

Questioner:

- Before: Discuss what the problem is asking, what needs to be solved. Do you need any more information?
- After: Lead discussion in group, does our answer makes sense? Did we answer the question that was asked?

Strategizer:

- Before: What strategies would you use for this problem? Discuss what other problems you have solved before that remind you of this problem. What strategies were successful?

Reflector:

- Before: Discuss your thoughts about the plan you have set up? Will this plan help you find the answer? Why or why not?
- After: What have we learned? How can we use this information is again?

Reporter

Read the problem to the group.

Before you solve: Begin to discuss what you know about the problem. Talk about the math facts that you see in the problem. Do you understand the problem?

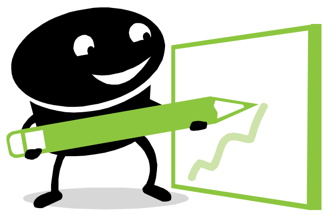
After you solve: Report the group's solution and reflections to the class.

Questioner

Before you solve: After reading the problem, lead the discussion about what the problem is asking you to solve. Do you need any more information? What units will your answer use? Do you understand the problem?

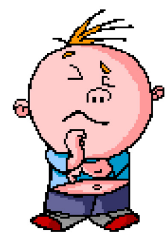
After you solve: Lead discussion in group, does our answer makes sense? Did we answer the question that was asked?

Strategizer



Before you solve: Lead the discussion, does this look like other problems? Begin to list which strategies may work for this problem. Which strategies would work best for this problem?

Reflector



Before you solve: Does our plan make sense? What could go wrong?
After you solve: What have we learned? How can we use this information is again?

Appendix G

Common Core State Standards for Mathematics

Develop understanding of fractions as numbers.
CCSS.Math.Content.3.NF.A.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.
CCSS.Math.Content.3.NF.A.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.
CCSS.Math.Content.3.NF.A.2a Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.
CCSS.Math.Content.3.NF.A.2b Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

CCSS.Math.Content.3.NF.A.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
CCSS.Math.Content.3.NF.A.3a Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
CCSS.Math.Content.3.NF.A.3b Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.
CCSS.Math.Content.3.NF.A.3c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.
CCSS.Math.Content.3.NF.A.3d Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

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[1] (Polya 1945)
[2] (McNamara and Shaughnessy 2010)

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KEY LEARNING, ENDURING UNDERSTANDING, ETC.

Students will be able use an interactive journal to record definitions and create an illustration to depict terms.; Students will be able to compare two fractions with the same numerator or the same denominator and reason about their size.; Students will be able to look at a recipe that utilizes fractions and extend the measurements.

ESSENTIAL QUESTION(S) for the UNIT

Why should we learn about fractions? What is the importance of vocabulary? What is a numerator? What is a denominator? What matters more when determining the size of a fraction, the numerator or the denominator? How do we use fractions in our everyday life?

CONCEPT A	CONCEPT B	CONCEPT C
Fraction Vocabulary	Comparing Fractions	Equivalent Fractions
ESSENTIAL QUESTIONS A	**ESSENTIAL QUESTIONS B**	**ESSENTIAL QUESTIONS C**
What is the importance of vocabulary? What is a numerator? What is a denominator?	What matters more when determining the size of a fraction, the numerator or the denominator?	How do we use fractions in our everyday life?
VOCABULARY A	**VOCABULARY A**	**VOCABULARY A**
fraction, denominator, numerator, interval, unit fraction, number line, end point, equivalent fraction, halves, thirds, fourths, sixths	partition, equal parts, reasonable, compare, less than, greater than, equal to,	equivalent fraction, equivalency

ADDITIONAL INFORMATION/MATERIAL/TEXT/FILM/RESOURCES

During concept A, students will be creating flip books in their interactive journals to define and illustrate fraction vocabulary. During concept B, students will need flash cards with pictorial representations of the fractions, or another tangible fraction model in order to play a game similar to war in order to compare the sizes of fractions. During concept C, students will look at recipe task cards and will be determining equivalency of a variety of fractions. Additional resources that will aid during the instruction of this unit will be a variety of 3-D fraction models, ie. Fraction cubes, fraction discs, fraction flash cards.