

Mastering Fractions

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Mastering Fractions
Florida Sunshine State Standards
Grade 3 - 5

Number Sense, Concepts, and Operations

Standard 1:

The student understands the different ways numbers are represented and used in the real world. (MA.A.1.2)

1. names whole numbers combining three-digit numeration (hundreds, tens, ones) and the use of number periods, such as ones, thousands, and millions and associates verbal names, written word names, and standard numerals with whole numbers, commonly used fractions, decimals, and percents.
2. understands the relative size of whole numbers, commonly used fractions, decimals, and percents.
3. understands concrete and symbolic representations of whole numbers, fractions, decimals, and percents in real-world situations.
4. understands that numbers can be represented in a variety of equivalent forms using whole numbers, decimals, fractions, and percents.

Standard 3:

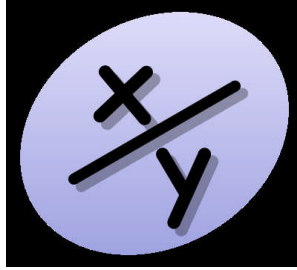
The student understands the effects of operations on numbers and the relationships among these operations, selects appropriate operations, and computes for problem solving. (MA.A.3.2)

1. understands and explains the effects of addition, subtraction, and multiplication on whole numbers, decimals, and fractions, including mixed numbers, and the effects of division on whole numbers, including the inverse relationship of multiplication and division.
2. selects the appropriate operation to solve specific problems involving addition, subtraction, and multiplication of whole numbers, decimals, and fractions, and division of whole numbers.
3. adds, subtracts, and multiplies whole numbers, decimals, and fractions, including mixed numbers, and divides whole numbers to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.

Standard 5:

The student understands and applies theories related to numbers. (MA.A.5.2)

1. understands and applies basic number theory concepts, including primes, composites, factors, and multiples.



Mastering Fractions

Fractions are regularly looked upon by some students as a bit more difficult to learn since understanding fractions requires learning various unique concepts and skills. Mastering Fractions” provides teachers with instructional strategies that will increase student understanding and improve student learning. This Idea book gives teachers a resource of ideas for teaching fractions by using motivating activities, silent response, models, manipulatives, and tricks for adding and subtracting fractions.

Students learn best when they are motivated and actively involved in the lesson. Students will learn concepts, practice skills and utilize knowledge while making models, using manipulatives and participating in enjoyable activities. Teachers can easily assess students in an informal manner, assuring the child’s acquisition of the concepts and skills. Students are making their own discoveries, and can easily move from the concrete world to the abstract concepts of mathematics.

Teaching students the ‘tricks’ to solve fraction problems make it easier for them to arrive at the correct answer in less time, and with less chance of making a mistake. These tricks will improve their standardized test scores since the time needed to solve a fraction problem will be less, allowing them more time to work on other test items.

Allowing students to discover these important mathematical experiences will create a foundation of understanding and a positive attitude for mathematics that will last a lifetime.

This set of ideas will deal with fractions as *a part of a whole* or *a part of a group*. While these strategies address fractions in their standard form, numerator over denominator, it must be noted that these concepts apply the same way to fractions written as a decimal or a percent.

It is important to note the developmental steps in understanding fractions, since when a student is having difficulty, the teacher must step backwards to the lower level of development to be sure the prerequisite skills and understandings are present.

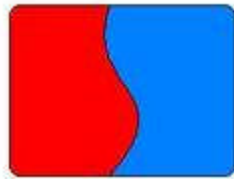
These steps are:

1. Concept of part of a whole *Each part is the same size*
or part of a group *Group recognition*
Identify the attribute being considered for the fraction
Each member of the group is the same as every other member
2. Numerator and Denominator
The numerator is how many parts you are ‘talking about’.
The denominator is the total number of parts in the group.
The smaller the denominator the smaller the piece

3. Comparing fractions
 - Fractions less than 1; Fractions equal to 1; Fractions more than 1
 - Fractions compared to one-half
4. Equivalent fractions - are a different name for the same value
5. Simplifying/Lowering fractions
6. Changing mixed numbers and improper fractions
7. Adding / Subtracting Fractions
8. Multiplying / Dividing - Reciprocals

Teaching Tip

When presenting fractions to students it is important to clearly express what is the 'whole' whether it is part-of-a-whole or part-of-a-group.



Mathematics is the Study of Patterns and Relationships Reys, R. E. 1992

Whole Group Silent Response

In order to obtain 100% participation in an interactive whole class activity the teacher must use techniques to allow the entire class to respond silently. Using these techniques gets, and keeps, everyone involved. Manipulatives, such as pattern blocks and Unifix cubes, are an excellent material which may be used to accomplish 100% student participation.

Depending on the age and the activity, these 'games' should be used for five to ten minutes. They may be used in all subject areas, and are only limited by the teacher's creativity.

Sit Down / Stand Up

This game allows students to move in response to questions that have only two choices for the answer. For example; is the number **odd** or **even**?, the word a **noun** or a **verb**?, or do you **add** or **subtract** to solve a given word problem? This allows the teacher to provide for some student movement while lessons continue.

To play, the teacher writes 'Sit Down' and 'Stand Up' separately on the board. Then next to each command the teacher writes what is the answer to have the student 'Sit Down' or 'Stand Up'. For example, he could write ODD next to 'Sit Down' and EVEN next to 'Stand Up'. Then he would say a number, "14". The students would then 'Stand Up' because it is an even number. Then the teacher says, "5", and the students would 'Sit Down'. Repeat using a variety of numbers. The fun starts when the teacher repeats the same direction; "7", 'Sit Down', "21" 'Sit Down', "437" 'Sit Down' over and over, and speeds up.

Students that may not have the skill will catch on as they copy and try to keep up with the activity. The game becomes an immediate assessment as the teacher can observe if the students cannot follow the direction because they do not 'have' the required knowledge or understanding.

Finger Spell Using American Sign Language

Students can respond to questions requiring a one letter response by using finger spelling. For example, the teacher could be assessing the students' ability to classify words as nouns or verbs. The teacher would say a word, "cow", and the student would either make the sign language symbol of N, noun, or V, verb. This technique could be used with several possible letter responses, such as Liquid, Gas, or Solid; Carnivorous, Herbivorous, or Omnivorous; and Land, Water, or Sky.

You could compare two numbers, fractions or decimals and have the students finger spell 'L' for Less than and 'G' for Greater than. For example $3 + 4$ is *blank* $2 + 7$; $3/4$ is *blank* $1/2$; or $1/4$ is *blank* $.75$. You can add the symbol for 'E' to represent equal to, then you can add statements like; $1/4$ is *blank* $.25$, $1/4 + 3/4$ is *blank* 1 . and 50% is *blank* $1/2$. This could also be used to practice measurement values such as 2 cups is *blank* one pint or 3 feet is *blank* one yard.

Whiteboards

Students may use individual whiteboards to write their response and show it to the teacher. Students may use an old sock placed over their hand as an eraser. To help students show the whiteboard correctly, using a sharpie marker place an arrow pointing to the top on the back of the board.

Students' responses may be a letter, a number, a geometric shape, a math symbol, a word, a smiley face, or any symbol the teacher introduces as the response. For example, in math the students could write the $<$, $>$, or $=$ signs; mathematical terms or abbreviations, or just write numerical answers. If the social studies question is, "Is the body of water a river, a lake, or an ocean?" The answers may be wavy lines for a river, a big wave for an ocean, and a circle for a lake.

Commercial whiteboards may be purchased from \$3.00 to \$6.00 each. However, a less expensive alternative, that works just as well, is shower board which may be purchased by the large sheet at a home improvement store such as Home Depot. Many stores are willing to cut it at no cost, making the cost of these whiteboards approximately \$0.60 a piece.

Number Cards

Students can make playing card size cards and place the digits 0 - 9, one digit on each card. Older children may use 2 sets at once. The students can now hold up the numbers in response to math questions. For example, practice multiplication facts with the students holding up the 2 digit answers. For example, $2 \times 6 = ?$, and the students hold up cards 1 and 2 for 12. Or create number patterns and have the students show the next number or numbers to continue the pattern. For example, 5, 11, 17, ? and the students hold up cards 2 and 3 for 23.

A smaller set of cards, 1 centimeter squares, can be made and used for students to place the answers on their desks. This works well to practice place value when longer numbers are called for. For example, "Show the number 142, 675."

For storage, place the cards in a zip-loc bag or a film canister.

Constructivism

Constructivism is a philosophy of learning founded on the premise that, by reflecting on our experiences, we construct our own understanding of the world we live in. Each of us generates our own "rules" and "mental models," which we use to make sense of our experiences. Learning, therefore, is simply the process of adjusting our mental models to accommodate new experiences.

The purpose of learning is for an individual to construct his or her own meaning, not just memorize the "right" answers and regurgitate someone else's meaning.

[Funderstanding Constructivism <http://www.funderstanding.com/constructivism.cfm>]

In order for students to construct their own meaning, they must be allowed to independently discover the concepts and knowledge, and then make this understanding their own. This method of discovery is well suited for mathematics learning.

Guided Discovery

Guided discovery, an approach to instruction and learning, will help students personalize the concepts under study, creating an understanding that cannot be matched using any other method of instruction. The teacher must *guide* the students toward the discovery. This can be accomplished by providing appropriate materials, a conducive environment, and allotting time for students to discover.

Guided discovery greatly impacts instruction. It is the responsibility of the teacher to 'set' the student up to make the desired discovery. The teacher must provide all the necessary background knowledge to lead the student to the discovery. The student must realize the method(s) to be used to make the discovery. To assure this, the teacher may demonstrate what the students are expected to do. Thus, guided discovery becomes the goal of the lesson.

Manipulatives

Tips on Using Manipulatives

Plan ahead - Have the manipulatives ready for student use. Prepare bags or containers ahead of time.

Have the manipulatives easily accessible for the students.

Allow the students time to explore the manipulative **before** you use them for a lesson.

Make student rules for using manipulatives.

Maintain a brisk pace when teaching a lesson.

Allow students to make predictions and estimations.

Allow a great deal of time for exploration. Use a timer.

Use correct terminology, but do not let the vocabulary get in the way of the lesson.

Be ready to ask questions or pose challenges for those who finish quickly.

Use the overhead manipulatives for demonstration.

Clean them.

Teachers may prefer not to use manipulative because they feel they are more work than they're worth. That is why it is important to create an easy system of making the manipulatives accessible for the students. I have my students seated in groups of 5 or 6 and then add an extra desk in the middle of the group. This extra desk's legs are lowered as low as possible, then a low plastic bin is placed on top of the desk. This bin serves as storage for the manipulatives and any other items they may use as a group. There is also an empty desk which is used for student projects that are not finished and should not be taken home. I use a large binder clip to organize the papers in the desk. Using this method allows the students to have at their fingertips the materials or previous work they need with a minimum of classroom movement. Also, dividing the manipulative by groups forces each group to be responsible for 'their' manipulatives.



Unifix Cubes

Unifix Cubes are colorful, interlocking cubes which help children learn number and math concepts. Unifix Cubes represent 'units' and link one way. They are a good manipulative for counting since they fit well in little hands and are handled easily. The ten solid colors make them quite visual for demonstrations and easily allow for patterning and sorting. The single opening for linking is a useful and a fun way for children to hold the cubes.

The cubes are well suited for developing the concept of a fraction meaning a part of a group and the concept of a numerator and denominator.

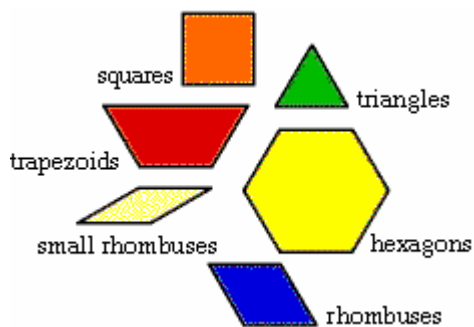
Activity - Give each student 20 cubes, 10 each of 2 colors. Introduce to students that fractions can mean a part of a group. Use four cubes, three of one color (blue) and one (red) of another color. You can place them, one each on top of your four fingers of one hand. Show and explain that a fraction has a top (numerator) number and bottom (denominator) number. The bottom number is the total number of parts in the group. In this case, four. The top number is the number of parts we are talking about, in this case one red cube. Write $\frac{1}{4}$ and make the connection between the cubes and the written fraction. Now exchange a blue cube for another red. Now what is the new fraction for what part of the group is red? $\frac{2}{4}$. I always identify the denominator first. Repeat, now making it $\frac{3}{4}$ red.

Now the students should work with you following your directions to create and describe fractions as part of a group. They enjoy putting the cubes on their fingertips. For example, "Let's make a group of three. How many cubes do we need? Use two of one color and one of your other color. What part of the group is the one cube? $\frac{1}{3}$ What part of the group is the other two cubes? $\frac{2}{3}$

If you wish, introduce $\frac{3}{3}$ equal one whole. Now let's make them all the same color. What fraction is this? $\frac{3}{3}$. Repeat, repeat, repeat. Once they understand, you can just say, "Show me $\frac{2}{5}$. What fraction of the group is the other color, the three cubes? $\frac{3}{5}$."

Equivalent Fractions - You can easily introduce equivalent fractions continuing the same method. Have the students make $\frac{1}{3}$, using their two colors, on three fingers. For example, one red and two blues. Now, have them put a second cube on each finger matching the first colors: a second red, a second blue, and a second blue. They now have a total of six cubes, two red cubes on one finger and four blue cubes on two fingers. Now, "How many total parts are in the group? 6. How many are red? $\frac{2}{6}$. Is that the same as $\frac{1}{3}$? Yes! Yes $\frac{1}{3}$ is equivalent to $\frac{2}{6}$. Let's look at the blue ones. What fraction are they now? $\frac{4}{6}$. Is that the same as $\frac{2}{3}$? ... Now continue the pattern adding another red and 2 more blues. Now $\frac{1}{3} = \frac{3}{9}$ and $\frac{2}{3} = \frac{6}{9}$. Continue and repeat using other fractions.

You can also reiterate the equivalency of a whole. For example use two same color cubes on two fingers. What fraction does the cubes represent? $\frac{2}{2}$. Two halves equal one whole. Now add one to each finger, same colors. Now $\frac{4}{4} = \frac{2}{2}$ which equal one whole. An so on.



Pattern Blocks

Pattern Blocks are one centimeter thick multicolored blocks that come in six shapes; hexagons, squares, trapezoids, triangles, parallelograms, and rhombi. For ease in identification, each shape is made of only one color. For example, all hexagons are yellow and no other shape is yellow. The blocks may be used to demonstrate, discover and explore many mathematical concepts.

Use pattern blocks to introduce fractions to students. Once the teacher explains the fractions using the overhead blocks, students can explore a whole, halves, thirds, and sixths. When talking about fractions, a part of a whole, it is important to identify clearly what is the whole. To begin, use the hexagon as one whole.

Activity - Students must have at least one hexagon, three rhombi, and six triangles. More blocks should be available. The teacher first writes the word "whole" and discusses with the class what a 'whole' means to them. Then the idea of fractions is introduced, being a part of a whole. On the overhead the teacher then displays the hexagon and states, "This is the whole." Students follow at their desks. The teacher then asks, "Can you make more wholes,

yellow hexagons, using only one color to make it again. Go ahead and try.” Students work to build using pieces of the same color to duplicate the hexagon. Students having difficulty may be prompted to build the new whole on top of the hexagon in a puzzle-like fashion. Allow students plenty of time to explore. Those who finish quickly can be challenged by asking, “Are there other ways the pieces can fit into each other, always using just one color?” After all students have built more hexagons the teacher then discusses and names the fractions. As this is done, the concepts of a numerator and denominator are revealed, introducing the math vocabulary terms. “Let’s look at how we made more hexagons. How many red ones make the whole? [Introduce how fractions are written.] Two. Each one is called one half. [write $1/2$] The bottom number is the total number of pieces needed to make the whole and the top number is how many we are talking about, one over two, one half. To make the whole we must have two halves, 2 over 2, $2/2$.” Repeat this for thirds and sixths. At this point the concept of fractional names of a whole may be emphasized. $1 \text{ whole} = 2/2 = 3/3 = 6/6$. “Is $6/6$ the same as $2/2$?” And so on. The teacher can then compare the concept to puzzles, “If we have a 20 piece puzzle, how many pieces do we put together to put it all together, to make one whole? ... $20/20 = \text{one whole}$. Have the students find other examples [crayons in the box, chapters in a book, days in a school week, or egg cartons] of parts making one whole.

Extension - Fold paper to show fourths and halves. The paper is one whole. Fold the paper in half and emphasize two halves make a whole. Then fold it in half again and show four fourths, four fourths make a whole.

Next - Repeat the above demonstration, using the trapezoid and rhombus as the whole. Now we can start naming parts of the whole using various fractions. “Let’s look at the thirds, the 3 blue diamonds, rhombi. Show me one third, explaining the concepts of the numerator and denominator once again. Compare the values of each fraction. “Which is more, $1/3$ or $2/3$? Which is more $2/3$ or the whole. $3/3$?” Continue using the thirds and sixths.

Comparison and Equivalent Fractions - Now we may compare each of the names for a whole with each other. Make the models of the whole, one hexagon. Review the names and meanings of each fraction as a part of a whole. Now let’s look at each whole and compare them to each other. Which is bigger $1/2$ or $1/3$? $1/3$ or $1/6$? This shows an important concept of fractions, as the denominator gets larger the part of the whole is smaller. [Compare it to jigsaw puzzles.] Next compare other combinations. Which is bigger $2/3$ or $5/6$? $1/2$ or $2/3$? And so on.

Finally, using the fraction models of the hexagon, start comparing equivalent fractions. Which is bigger $1/2$ or $3/6$? $2/3$ or $4/6$? And so on. “Can you find some more equivalent fractions?” Remind them that $1/1$, $2/2$, $3/3$, and $6/6$ are also equivalent fractions,

Ratios Use Pattern Blocks to introduce ratios. Compare the block to its number of sides, For example one square has four sides, 1 to 4 ; the hexagon, 1 to 6; and the triangle, 1 to 3. From there you can set up proportions. one hexagon to six sides, two hexagons to 12 sides, three hexagons to 18 sides, and so on. Make a table showing this proportion and have the students notice the pattern.

Math Balance Scales

The standard math balance scale may easily be transformed to a fractions balance scale. Just turn the scale around and label the pegs on the opposite sides. Using small stickers you can label the pegs the fractions that your class is working on, can compare, or find the equivalents. For example, in second grade I labeled the pegs at $1/4$ intervals, marking the pegs starting next to the zero: $1/4$, $1/2$, $3/4$, 1 , $1\ 1/4$, $1\ 1/2$, $1\ 3/4$, 2 , $2\ 1/4$, and $2\ 1/2$. Students may now use the balance to compare fractions and add fractions.

Another method would be to label each side of the zero for the purpose of exploring equivalent fractions. For example, if you wish to compare thirds and sixths, label the pegs on one side of the zero, the number $2\ -\ 1/3$, number $4\ 2/3$, number $6\ 3/3$ or 1 , number $8\ 4/3$, and number $10\ 5/3$, and label the other side using every peg by sixths, $1/6$, $2/6$, $3/6$, $4/6$, $5/6$, $6/6$ or 1 , $7/6$, $8/6$, $9/6$. and $10/6$. You can also use mixed number to compare improper fractions and mixed numbers.



A fraction balance scale is available that nicely shows less than, greater than, and equivalent relationships. Teachers and students may use this as a model to show basic addition of fractions, with or without common denominators.

Coins

Coins, and their values, may be used to teach and practice fractions. Coins values are already known to most students, including using the fraction names for 50 cents, a half dollar, and 25 cents, a quarter. The teacher may have to introduce the fraction names for a penny, $1/100$, a nickel, $1/20$, and a dime, $1/10$. While this idea of using coins as fractions may be new to the students, the fractions themselves are common and easy to compare and add or subtract. Also the idea of lowest terms, simplest form, may be discussed with the idea of using the fewest coins for a value. For example what same coins could I use to make 50 cents? 50 pennies, $50/100$, 10 nickels, $10/20$, and 5 dimes, $5/10$, 2 quarters, $2/4$, and one half dollar, $1/2$. Which set of coins would be the least number of coins? ... one half is the simplest form. When beginning to teach this comparison, use only one pair of equivalent values and decide which of the pair is in lowest terms. 3 nickels or 15 pennies?

Teachers may use the coins to set up equivalent fractions as instructional examples followed by a student activity. For example, using pictures or words, show that 1 quarter equals 5 nickels. Then show the equivalent fractions; $1/4 = 5/20$. After giving other examples, then give students equivalent fractions to solve; e.g. 3 dimes = how many nickels?, 5 dimes = how many quarters?, 15 pennies = how many pennies.

You may then set up addition and subtraction examples in the same manner, using the coin values as fractions.

Teachers may then include the concept of mixed numbers and improper fractions, and changing a value from one to another, showing \$1.50 means $3/2$'s and $1\ 1/2$.

Fraction Word Puzzles

One type of a fraction word puzzle that is easy for the teacher or student to make uses each word as a whole and using a single direction selects a letter or letters from that word to fill in a mystery word, phrase, or quotation.

For example: the middle $\frac{3}{5}$ or south is o-u-t

A short puzzle:

Fill in each blank using the parts of each word in order.

_____.

Use the middle $\frac{1}{2}$ of beat. E-A

Use the last $\frac{1}{3}$ of beauty. T-Y

Use the last $\frac{3}{4}$ of hour. O-U-R

Use the last $\frac{1}{2}$ of have. V-E

Use the first $\frac{1}{3}$ of gentle. G-E

Use the first $\frac{5}{6}$ of tablet. T-A-B-L-E

Use the middle $\frac{1}{5}$ of laser. S

Answer: Eat Your Vegetables

Students practice their fractions and spelling when making these puzzles. Have students create the puzzles, then use them as whole class practice or homework.

Edible Fractions

When working with any edible in the classroom you must be aware of any allergies, dietary restrictions, and school rules. Always have the students wash their hands, and use a clean surface. I have the students use a paper towel on their desk as a clean surface.

Hershey Bars

Hershey bars make perfect models for equivalent fractions, since the regular size bar is divided into 12 parts. This allows students to have a tasty manipulative that can show halves, thirds, quarters, sixths, and twelfths. I use the bars as a group activity, giving one bar per group. The students are assigned to write 10 pairs of equivalent fractions that can be shown with the pieces of the bar.

Graham Crackers

As a snack and culminating activity, I gave each student one whole graham cracker and tell them to break the cracker to show a pair of equivalent fractions. Most graham crackers are divided into fourths. I used this in fourth grade and was surprised with the results. Some students went beyond what I expected when they broke the cracker in many pieces showing fractions with larger denominators, for example, $\frac{1}{2} = \frac{5}{10}$. Some students created more crumbs than fractions.

Cereal

Cereal can be used with students to explore the concept of a part-of-a-group. You can use two types of cereal and the total of the two pieces will make the group. For example, use Cheerios and Apple Jacks as the group, giving a combination of the two types in a small handful, or zip-loc bag, to each student. Using the cereal pieces as the manipulative the students then create the fractions that you say; “Show me $\frac{2}{3}$ ’s.” As the students show $\frac{2}{3}$ of one type, have them observe and express that $\frac{2}{3}$ are Cheerios and $\frac{1}{3}$ are Apple Jacks, making $\frac{3}{3}$, one whole.

The two types of cereal may be used to show equivalent fractions using the same type of cereal for the specified fractions in both groups. If you make a group $\frac{3}{5}$ Cheerios, then make the equivalent group $\frac{6}{10}$ Cheerios.

Finally, you can use a cereal with several colors (Froot Loops) or shapes (Lucky Charms) to create several fractions that equal to one, the whole. For example, using Froot Loops, show me a group that is $\frac{2}{5}$ red, $\frac{2}{5}$ yellow, and $\frac{1}{5}$ orange.

Student Made Model - Double Plate

This model requires use two 5 inch paper plates per student. The teacher should use bigger plates for the classroom model. The student completely colors one plate one dark color using a crayon or marker. Next stack the 2 plates. Using scissors, make one straight cut going through both plates from the edge to the center, in math terms, cutting along the radius. Now take apart the plates and put one plate in each hand. With the cut of each plate facing the other, push the plates together so the plates connect meeting at the center of each plate. Now lay the plates flat and there will be parts of each plate visible, a white part and a colored part. Each of these parts can now represent a fraction. The plates will slide over each other, so the white and colored parts can be changed to represent many fractions. For example, make the plates show $\frac{1}{4}$ colored and $\frac{3}{4}$ white. Not only can students easily model fractions, they can also see that the two parts make one whole, $\frac{1}{4} + \frac{3}{4} = \frac{4}{4}$, one whole.

You now have a fraction model that can be used to show fractions and compare fractions. You can pair students and have one make $\frac{1}{3}$ and the other make $\frac{1}{4}$ and compare them.

These plates can also be used to show fractions as percents and decimals. Same activities, just different terms and applications. The percentages can also be interpreted as a pie graph.

After doing this with students for years, a student asked. “Can we put three plates together?” I had never thought of doing this, but it works with a little extra manipulation. Then you can have three fractions equal the whole and can show equivalent fractions using the single model. For example, show $\frac{1}{2}$ white, $\frac{1}{4}$ blue, and $\frac{1}{4}$ green. The student sees that $\frac{2}{4}$ ’s is the same as $\frac{1}{2}$. Using that idea, you can model addition problems.

Finally, this model can serve as a great model for geometry. Students can create their own acute, right, obtuse, and straight angles. They can demonstrate this understanding of degrees as they create an angle with the measurement as specified by the teacher. For example, “Show me a 45 degree angle, Show me a right angle, show me a 120 degree angle.” Then the teacher can talk about reflex angles and note that the 2 angles equal 360 degrees, the circle.

Everyday Fraction Questions

What part of your family is children? adults? go to school? work? are males?

The house: What part of the room has tables? Has TVs?
People sleep in? Eat in? Have beds?

Alphabet: What part of the printed alphabet have letters with curves?
Only straight lines? Only curved lines?

Calendar: What part of the year are you in school? months
Have 31 days? Have only 28 days? Have exactly 30 days?
Have the letter "R" in its name? Have holidays?

United States: What part of the states border an ocean? The Gulf of Mexico?
Border the Great Lakes? Do not border a major body of water?
Border the Mississippi River? Are east of the Mississippi River?
Are north of Tennessee? Have the Rocky Mountains in them?
Have you visited? Have you not visited?

U.S. flag: What part of the flag's stripes are red? White? Blue?
What part of the stars are white?

What part of the book have you read?

Toys and Games

Playing Cards: What part are clubs? Queens? Red? Black?
One-eyed jacks? Face Cards? Have even numbers?

What part of the jigsaw puzzle have you completed?

Game boards: What part of the checkerboard is black?
What part of the Scrabble board has pink squares?

Playing Pieces: Size? Color? Shape?

Once the child has the concept, let him/her ask the questions.

A little more thinking ...

What part of the 30 min. TV show is commercials?

What part of a dollar bill is green?

What part of your clothes is synthetic?

Speed Fractions

This method allows student to add and subtract fractions with unlike denominators mentally. Students will need to know how to cross-multiply, reduce fractions to lowest terms, and change improper fractions to a mixed number.

* When numerators in the addends are 1

$$\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$$

Steps:

1. For the denominator in the sum, multiply the denominators in the addends. $2 \times 3 = 6$
2. For the numerator in the sum, add the denominators in the addends. $2 + 3 = 5$

$$\frac{1}{3} + \frac{1}{4} = \frac{7}{12} \quad (3+4) \quad \frac{1}{5} + \frac{1}{2} = \frac{7}{10} \quad (5+2)$$

$$(3 \times 4) \quad (5 \times 2)$$

* When numerators in the addends are not 1

$$(2 \times 7) \quad (3 \times 5)$$

$$\mathbf{14} + \mathbf{15}$$

$$\frac{2}{3} + \frac{5}{7} = \frac{29}{21}$$

Steps:

1. For the denominator in the product, multiply the denominators in the addends. $3 \times 7 = 21$
2. Cross multiply.
 $2 \times 7 = \mathbf{14}$
 $3 \times 5 = \mathbf{15}$
3. For the numerator in the product, add the cross multiplied products. $\mathbf{14} + \mathbf{15} = \mathbf{29}$
4. Simplify if necessary

$$(2 \times 4) \quad (3 \times 5)$$

$$\mathbf{8} + \mathbf{15}$$

$$\frac{2}{5} + \frac{3}{4} = \frac{23}{20} = 1 \frac{3}{20}$$

$$(4 \times 5)$$

$$\mathbf{15} + \mathbf{8}$$

$$\frac{5}{8} + \frac{1}{3} = \frac{23}{24}$$

* When subtracting use the same method as adding, only subtract the cross products.

$$(1 \times 5) \quad (3 \times 1)$$

$$\mathbf{5} - \mathbf{3}$$

$$\frac{1}{3} - \frac{1}{5} = \frac{2}{15}$$

$$(3 \times 5)$$

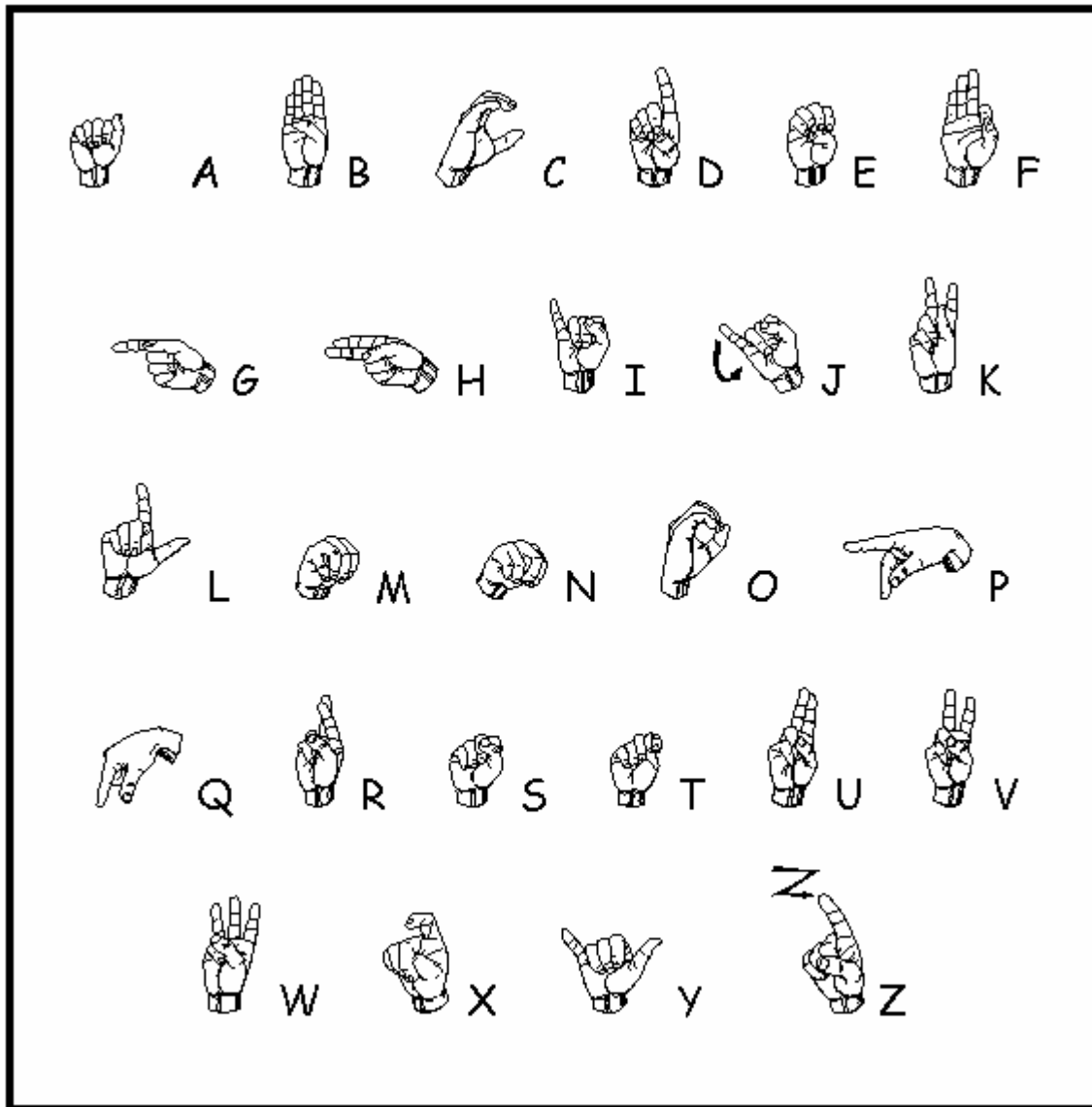
$$(2 \times 5) \quad (3 \times 3)$$

$$\mathbf{10} - \mathbf{9}$$

$$\frac{2}{3} - \frac{3}{5} = \frac{1}{15}$$

$$(3 \times 5)$$

American Sign Language Manual Alphabet



From: <http://library.thinkquest.org/J001156/writing/asl.GIF>

Other printable ASL Alphabets

http://www.humboldt.edu/~sdrc/general_services/interpreting/asl_manual_alphabet.jpg

<http://images.infoplease.com/images/signalph-alpha-web.gif>

Budget - “Mastering Fractions”

Quantity	Item	Cost	Total
1000	Unifix Cubes	\$81.98	\$81.98
1 set	Overhead Unifix Cubes	\$7.25	\$7.25
2 sets	Plastic Pattern Blocks 250 Piece	\$19.95	\$39.90
1 each	Exploring with Pattern Blocks	\$10.95	\$10.95
1 each	Overhead Pattern Blocks	\$4.95	\$4.95
1 Set	3D Magnetic Plastic Shapes	\$42.95	\$42.95
1each	Math Balance Scale	19.95	\$19.95
1 each	Fraction Balance Scale	29.95	\$29.95
1 each	Exploring Fractions & Decimals	7.95	\$7.95
1 each	Equiv. Fractions Matching Cards	24.95	\$24.95
	Shipping		\$20.00
		TOTAL	\$290.78

Purchase online:

Didax <http://www.didaxinc.com/> free shipping.

Discount School Supply <http://www.discountschoolsupply.com/>

Internet Resources

This Idea Book is available on **Dr. Labush's Links To Learning**

<http://www.netrox.net/~labush/>

Math Links, Lessons, and Resources <http://www.netrox.net/~labush/math.htm>

Interactive Sites

Fractions

Brain POP Movie - Adding and Subtracting Fractions

<http://www.brainpop.com/math/numbersandoperators/addingandsubtractingfractions/>

Fraction Frenzy - Equivalent Fractions Starts Easy and becomes challenging

<http://www.learningplanet.com/sam/ff/index.asp>

Fraction Lessons Many topics explained <http://www.aaamath.com/fra.html#topic15>

Fraction Lessons by Coolmath <http://www.coolmath.com/fractions/index.html>

Fraction Lessons at Coolmath4Kids <http://www.coolmath4kids.com/fractions/index.html>

Fractions Workshops - Manipulatives to Practice Fractions

<http://www.iknowthat.com/com/L3?Area=FractionsWorkbench>

Fresh Baked Fractions - Find a Fraction Not Equivalent to the Other

Levels: Easy to Super Brain <http://www.funbrain.com/fract/index.html>

Gamequarium Fraction Games - Many Games and Activities

<http://www.gamequarium.com//fractions.html>

Least Common Multiple - Shows Multiples

<http://www.harcourtschool.com/activity/elab2004/gr6/4.html>

Match a Fraction to a Model - Basic

http://www.harcourtschool.com/activity/con_math/g03c21.html

Match Equivalent Fractions and Decimals

http://www.harcourtschool.com/activity/con_math/g04c22a.html

Match Equivalent Fractions, Decimals and Percents

http://www.harcourtschool.com/activity/con_math/g05c28.html

Mystery Picture - Solve a Fraction of a Whole Number Ex. $\frac{2}{3}$ of 30

<http://www.dositey.com/math/mistery2.html#s>

Pizza Game http://www.mrnussbaumgames.com/pizza_game/index.html

Saloon Snap - Match Fractions with Decimals and Percents

<http://www.bbc.co.uk/education/mathsfle/shockwave/games/saloonsnap.html>

Soccer Shootout - Add, Subtract, Multiply, and Divide - Four Levels

<http://www.funbrain.com/fractop/index.html>

Visual Fractions - A fraction Tutorial <http://visualfractions.com/>

WebMath Get a Visual of a Fraction <http://www.webmath.com/k8if.html>

Unifix Cubes

Adding and Perimeter

http://www.edb.utexas.edu/faculty/wstroup/Gen_Act_Web/I03/zga03.html

Creating, Describing, and Analyzing Patterns

<http://standards.nctm.org/document/eexamples/chap4/4.1/Part2.htm>

Counting Groups Preliminary Division

http://www.edb.utexas.edu/faculty/wstroup/Gen_Act_Web/I14/zga14.html

Graphing <http://www.successlink.org/great/g26.html>

Patterns <http://www.richlandone.org/teachers/connections/grade2/patterns.htm>
Pocket Counting Game Lesson Plan K - 1
<http://www.lessonplanspage.com/MathPocketCountingUnifixIdeaK.htm>
Problem Solving Activity Mr. McGregor's Garden
http://www.pattonville.k12.mo.us/services/showme_assessment/pdfdocs/1MrMcGre.pdf

Pattern Blocks

Addition Game <http://www.learnnc.org/LearnNC/lessonp.nsf/0/2783C94B63108F8C8525679B006234BF?openDocument>
Block Designs with Printouts
<http://www.eduplace.com/math/mathcentral/gradeK/koca2.html>
Create Pictures http://www.edu.pe.ca/westwood/MathArtWeb/pattern_block_pictures1.htm
Following Directions <http://www.hannibal.k12.mo.us/k12/Curriculum/Mathematics/FourthGrade/4MA4/4MA4%20LO1an.htm>
Fraction Shapes <http://math.rice.edu/~lanius/Patterns/notes.html>
Fractions http://web.cocc.edu/math/activities/fractions_with_pattern_blocks.htm
Investigation Fill in a Region <http://www.terc.edu/investigations/curr/HTML/men1.html>
It's A Perfect Fit Identify Numerical Relationships http://www.pbs.org/teachersource/mathline/lessonplans/esmp/perfectfit/perfectfit2_procedure.shtm
Pattern Block Activity Shapes are given values
<http://www.st-james.richmond.sch.uk/year4math.htm>
Pattern Block Game K
<http://www.saxonhomeschool.com/activities/patternblock/index.jsp>
Pattern Blocks Many ideas and activities
<http://fcit.usf.edu/math/resource/manips/pattern.pdf>
Tessellations <http://mathforum.org/sum95/suzanne/active.html>

Published Resources

Action Fractions with Hexadrons & Pattern Blocks: Frye and McAnallen, Koplw Games, Incorporated; 1995.
Apple Fractions: Pallotta, Jerry and Bolster, Rob. Cartwheel; 2003.
Clean Sweep Campers: Recht Penner, Lucille. Kane Press;2000.
Different Shapes, Equal Pieces: Fraction & Acres: Tierney, Cornelia. Dale Seymour Publications; 1997.
Eating Fractions: Mcmillan, Bruce. Scholastic; 1991.
Fraction Fun: (gr. 2-4) by Adler, David A. and Tobin, Nancy. Holiday House; 1997.
Fractions With Pattern Blocks: Zullie, Matthew. Wright Group/ McGraw Hill; 1988.
Funny & Fabulous Fraction Stories (Grades 3-6) Greenberg, Dan. Scholastic; 1999.
Give Me Half!: Murphy, Stuart. Harper Trophy ;1996.
Go, Fractions! (All Aboard Math Reader): Stamper, Judith. Grosset & Dunlap; 2003.
Hershey's Fractions (Hershey's): Pallotta, Jerry and Bolster, Robert C. Cartwheel; 1999.
Inchworm and A Half: Pinczes, Elinor J. Houghton Mifflin; 2001.
Jump, Kangaroo, Jump!: Murphy, Stuart and O'Malley, Kevin. HarperCollins Publishers; 1999.
Painless Fractions: Cummings, Alyece. Barron's Educational Series; 2006.
Rabbit and Hare Divide an Apple (Easy-to-Read): Ziefert Harriet. Puffin; 1998.