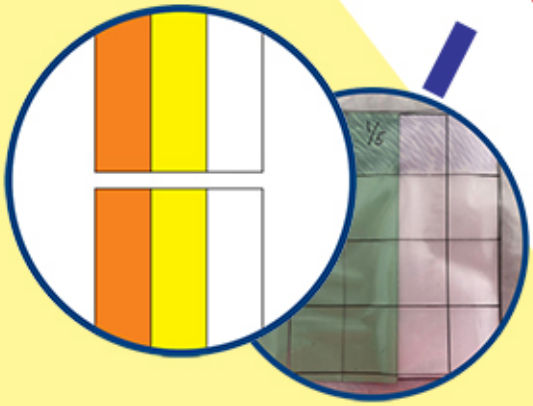
TEACH STEM THE FUN WAY!

FUN WITH FRACTIONS



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POWERLINEPROD.COM

Published by Powerline Productions/Kingdom Building Services, Inc.

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Making Fractions Clear

You must think that this title is impossible. I have seen it many times. Fractions can be hard to get. Most children can learn how to do what the teacher says to add, subtract, multiply, and divide fractions but few fully understand what they are and how they work. Some even have trouble remembering how to work with them because they don't understand them. We can change all that.

What really helps is manipulatives. When you are studying math using whole numbers, you can use anything to make math manipulatives. I've bought great ones from Math-U-See but sometimes budgets and other considerations make purchasing those impossible. When working with a larger group of students I have used cookies, candies, marbles, glass pebbles, rocks, dishes, toys, strips of paper, paper plates, and just about anything I could lay my hands on.

When working with fractions you need something a little more specific. You need things that you can divide into equal pieces. The most delicious things to use are pies, pizzas, cakes, brownies, and meatloaf. You may have noticed some things these foods have in common. They are all either circles or squares. Since it can be a little tricky to get them cut into perfectly even slices maybe we should try working with paper.

What kind of paper already looks a little like a pie? A paper plate does. If you make manipulatives out of paper plates you can do fun activities with adding and subtracting fractions. They can also help you to understand simple division and what a fraction really is. It's a simple division problem! We'll talk more about that later.

Pies and circles are not the best choice for practicing multiplication or division of fractions. For that we need rectangles or squares and a little something extra. Some call them overlays. I make them out of plastic sheet protectors or plastic zip bags.

Let's Make Some Paper Plate Pie Fractions!

What you will need:

9 Cheap 9" Paper Plates
9 Different Colors of Paint (Acrylic or Poster Paints), Markers, or Crayons
1 Black Sharpie Marker
Included Fraction Circle Templates found on page 45
Paint Brush (if using paint)
12" Ruler
Sharp Pencil
Scissors
1 Gallon Zip Bag

Color the center circle (about 6" in diameter) of each paper plate a different color. Remember to leave a thick uncolored border all around each plate. Let dry. Select one plate to write, with the Sharpie, a big one (1) in the middle of the plate. Set aside.

Cut out the included Fraction Circle Templates. Carefully center one Fraction Circle Template in the middle of each plate. Use the ruler and line it up along one of the lines going through the center of one of the templates. Using the pencil, extend the line printed on the template to the edge of the paper plate. For some plates and templates, you can extend the same line on opposite ends of the ruler. For others, like the thirds template, you cannot. Repeat for all the lines of this circle.




Remove the template and use the ruler and pencil to draw the cut lines. For the thirds, fifths, and ninths plates you will want to draw the line almost to the center first. Once all the lines are started you can better see where the center is to complete all the cut lines. For the rest of the plates you can draw the lines all the way across the paper plates.

Before you cut the fractions, write the name of the fraction in the white space of the plate, between each of the cut lines. Cut along the pencil marks. You now have one set of fractions. Repeat for the other plates/fractions. Store them all in a gallon zip bag until ready for play/study.

This set gives you enough fraction manipulatives to demonstrate that all the fraction of a particular size can be carefully placed and form one whole pie. They can even be stacked on the plate labeled one (1) to drive home this point. You can also stack fraction wedges in such a way to demonstration that two of the $\frac{1}{6}$ fractions set next to each other are the same size as the $\frac{1}{3}$ fraction, for instance. This makes a way to demonstrate renaming and adding fractions of different denominators.

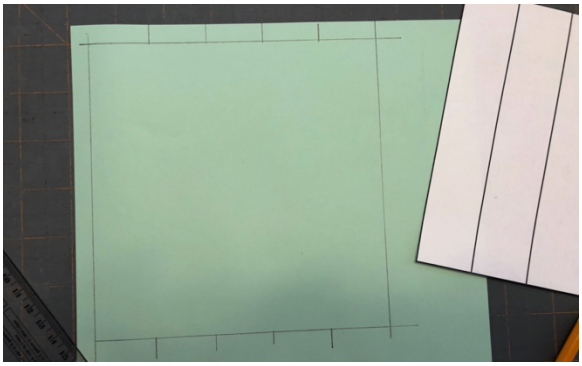
We didn't include more fractions because this set provides enough variety to practice many math problems. Once the concepts are mastered with these fractions, students can usually, on their own, make the leap to working with larger and less accommodating fractions.

Let's Make Some Fraction Squares with Overlays!

What you will need:

9 Standard Size Sheets of Construction Paper in 9 Different Colors
47 1-Quart Zip Bags
Included Fraction Square Templates found on page 61
Scissors
Ruler
Sharp Pencil
1 Black Sharpie Marker
9 Different Light-Colored Sharpie Markers

Carefully cut out the Fraction Square Templates along their outer border only. Use these templates and your pencil to draw squares onto the construction paper. Keep it neat because you'll want to use these templates to do activities later. Put a small mark on the outside of the squares at each cross line of the templates. Use your ruler and pencil to connect the marks. Carefully cut out the fraction strips along these lines.



To create the overlays lay the zip bags on top of the Fraction Square Templates. Using the ruler and the sharpie, trace all the lines onto the bags.

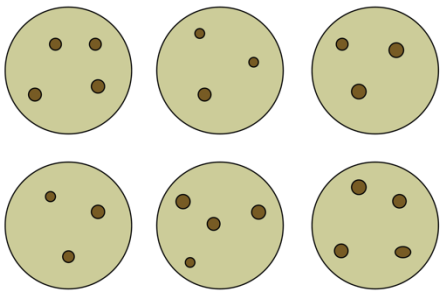
You will need to make multiples of each size because you will color them in to represent each fraction possible. For example, make three fraction overlays of the thirds fractions. On the first one you will color in the first rectangle. On the second one you will color in the first two rectangles. On the third one you will color in all three rectangles.

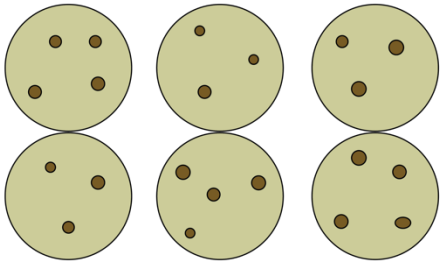
You could make a game of creating fraction manipulatives of varying sizes. Instructions for the Construction Paper Fraction Game can be found on page 22 in the Games section of this book.

What Are Fractions?

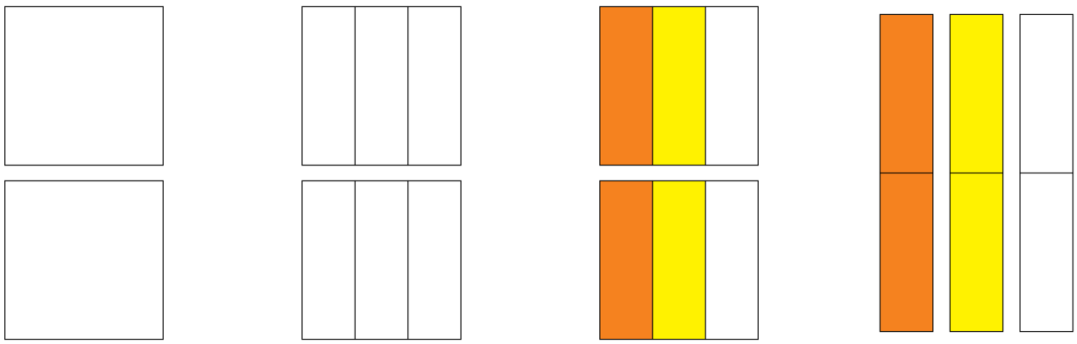
This is the question of the day. To put it simply, fractions are simple division problems. If you have one thing and you divide it into two, then you have two halves of the original. Each one of them is one half, written $^1/_2$ or $\frac{1}{2}$.

To really understand what we're talking about is to imagine having two things then dividing them by three. You may recognize that as being the fraction $\frac{2}{3}$ but not know why. After all the way I described what a fraction is doesn't explain this. Remember that when we divide things, we are separating those things into groups and naming the quantity in a single group. If we had six cookies and divided that by three, we would have two cookies in each group.





When dividing numbers to form fractions it really is the same thing. We start with two rectangles. We cut each of them into three pieces because we are dividing by three. I colored those strips to highlight that we can separate and regroup them, which I did for the last picture. We can see that each of the white strips is what you get when you divide a square by three. When you have divided two squares by three you have two white strips, thus $2 \div 3 = \frac{2}{3}$. If that is true, as I have shown you it is, then $\frac{2}{3}$ is the same as two divided by three.



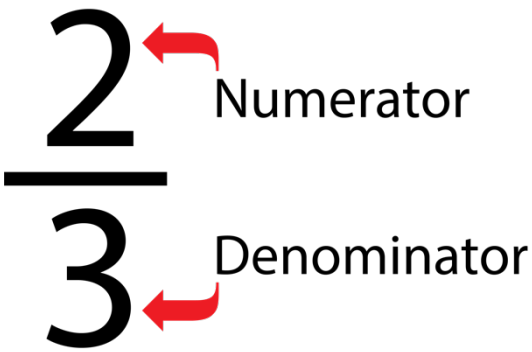
The Parts of a Fraction

A fraction is made up of parts. Each one has a name and a function. It is important to remember this vocabulary. The number on the top is called the **numerator**. The number on the bottom is called the **denominator**.

The numerator is actually pronounced noom-er-ay-tor. Notice that the "b" has just been left out of the word "number" then "ator" was added. You could think of it like "the numberator is the number of things."

The denominator is what you are dee-vide-ing by. Some of us already pronounce divide this way. If you can all think of it this way when thinking about fractions it will help.

It's important to know that the denominator is also the name of the fraction. We all act upon this fact whether we consciously know it or not. If we see some fractions all with a three in the denominator, we would refer to them as "thirds". We call them by their names.



Adding & Subtracting Fractions

For the discussion about adding and subtracting fractions I will only talk about adding because anything you can do with adding fractions you can do with subtracting them. The only exception to this rule is that you cannot rearrange the order with subtracting, but you can with adding.

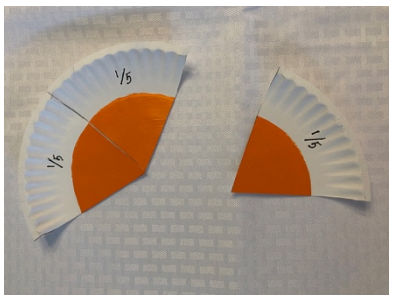
It is especially important to remember that the denominator of a fraction is its name when teaching adding fractions. You can only add fractions which have the same name. I use games like Go Fish and the Memory Game to drive home the importance of finding matching names.

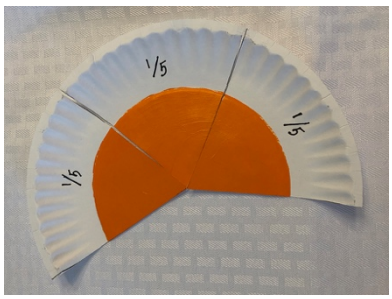
We did a variation on the Memory Game for our Math Club which worked well with teams of players, varying in ages from 11-18. We had some much fun. We called it The Name Game. You can find instructions on how the game works on page 24, in the Games section of this book.

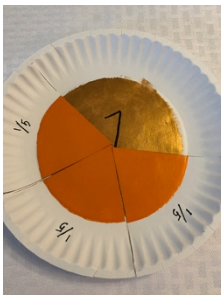
Since fraction all have a name, adding them together is just like trying to add two boys to three girls. When you add them together, how many boys do you have? How many girls do you have? You still just have two boys and three girls. To add them together you would have to rename them. You could call them all children, but not boy or girl.

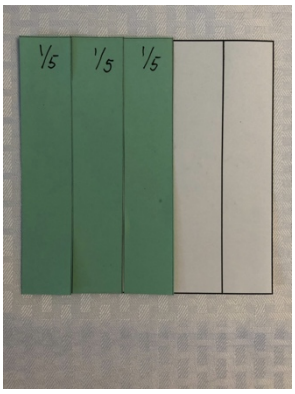
Adding fractions works the same way. Two thirds plus three fourths just gives you two thirds and three fourths. To actually add them together you would have to rename them all as twelfths. Let me talk about actually adding fractions and them I'm going to come back to this, using the fraction manipulatives.

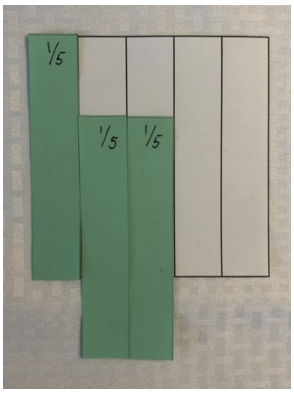
Adding fractions is actually quite simple. You simply add the numerators. Remember that the denominators are the names of the fractions and the numerators are how many things the whole has been cut up into. If you have $\frac{2}{5}$ and you have $\frac{1}{5}$, when you add them together you get $\frac{3}{5}$ because $2 + 1 = 3$ and the name stays the same. You could use your fraction manipulatives to act this out. Subtracting works the same way.

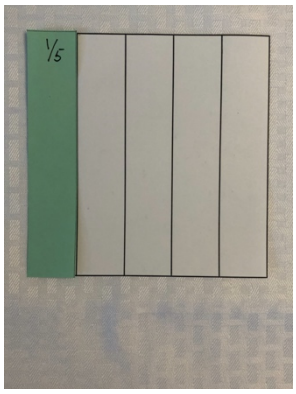












You could make the Adding Fractions Board Game to have fun with practicing it. I have included instructions on how to make your own on page 25 in the Games section of this book.

Multiplying Fractions

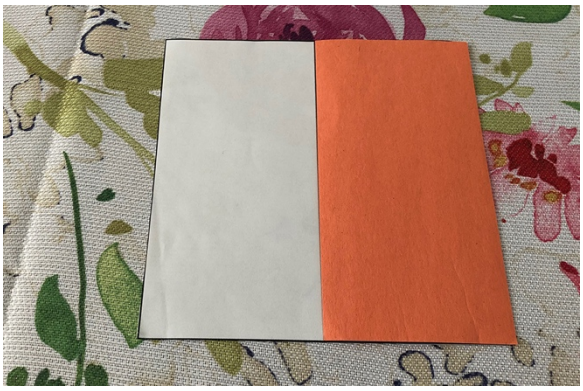
Before we can go back to renaming fractions you need to understand multiplying them. I promise, I will return to that. As you may have guessed, or remembered, renaming a fraction involves multiplying it by a very special version of one. But like I said, I will return to that.

In some ways multiplying is easier to do than adding fractions. The truth is that most people don't really understand what they are doing when they do multiply fractions. Let's try to clear that up, because it will make a big difference in the long run for your little mathematicians.

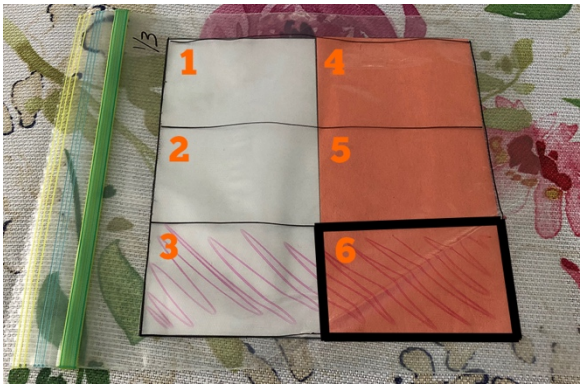
This is a good time to point out that all math symbols have an English (or any spoken language) equivalent. Math really is another language. That's part of the reason why I tell students you must do math every day, just like learning a new language. The multiplication symbol (x) actually translates as "of." Two times four is really "two of the fours" or eight. Because of the properties of multiplication, it also means "four of the twos" but that's another lesson.

When we're multiplying fractions times whole numbers it is really easy to see that $\frac{1}{2} \times 4 = \frac{4}{2}$ because "four of the one halfs" gives me $\frac{4}{2}$. Multiplying two fractions times each other gets a little trickier. When we have the problem $\frac{1}{3} \times \frac{1}{2}$ we are actually saying one third of the one halfs. Well that's weird.

This is when we break out the fraction manipulatives with the overlays. See the images below. There is the halves template with one $\frac{1}{2}$ strip laying on it. Next we placed the $\frac{1}{3}$ plastic overlay across the one half. Because we used light colored ink on the clear plastic, we can see the $\frac{1}{2}$ strip right through it. We can see that it has been cut into three pieces and the shading show us what $\frac{1}{3}$ of the $\frac{1}{2}$ is.

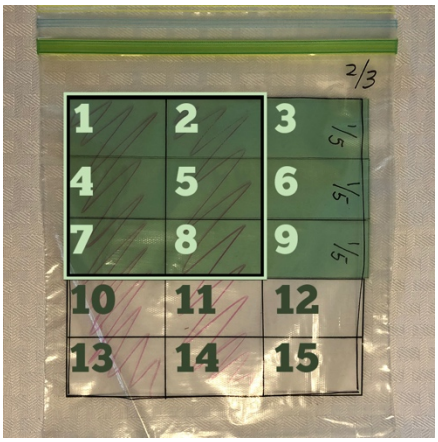


Now look at the whole setup. You can count all the rectangles which are made by the two fraction manipulatives together and there are six. Of all these six rectangles, only one is colored by the $\frac{1}{2}$ strip AND the $\frac{1}{3}$ rectangle, in other words, only one of the six rectangles is colored. That tells us that we have $\frac{1}{6}$ as a result of multiplying $\frac{1}{2} \times \frac{1}{3}$. In other words, $\frac{1}{3}$ of the $\frac{1}{2}$ is one sixth of the whole square.



You could also take one of the $\frac{1}{6}$ strips that we made, cut it up and tape it back together so that it is the exact same size as the little rectangle that we formed from multiplying $\frac{1}{2} \times \frac{1}{3}$.

All that demonstrates to you that to multiply fractions we multiply the numerators to get the numerator of the answer then we multiply the denominators to get the denominator of the answer. To demonstrate that this works with fractions that don't have a one see the picture below of $\frac{3}{5} \times \frac{2}{3} = \frac{6}{15}$.



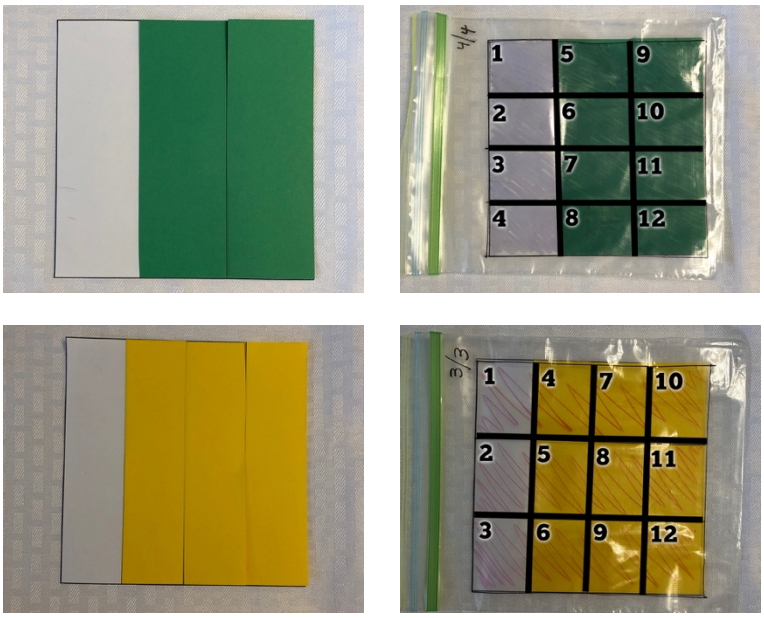
Renaming Fraction

Now that we know how to multiply fractions, we can talk about renaming them. To rename fractions we multiply them times one in such a way that their denominator, or name changes. We have to multiply them times one because that is the only way to make sure that their value does not change.

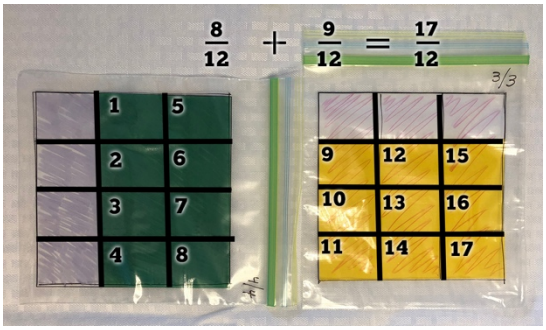
Let's go back to the first addition problem I mentioned that had different denominators, or names. Two thirds plus three fourths just gives you two thirds and three fourths unless you rename both fractions. But to what should we rename it?

To decide what the new name must be you look at both denominators and name the smallest number which can be formed by multiplying the denominator times another number. This is called the **Least Common Multiple**. **Least** because you are looking for the smallest number. **Common** because this number is a multiple of both denominators. They have it in common. **Multiple** because that's a number you get from multiplying numbers together.

Both fractions can be worked on independently. This means that they each can be multiplied by a different fraction. Those fractions must only equal one. Remember that anything divided by itself is one. So, a fraction which equals one is just a number over itself, like $\frac{2}{2}$ or $\frac{3}{3}$. For a fun way to practice this the Making One with Fractions Game is explained on page 37 in the Games section of this book.



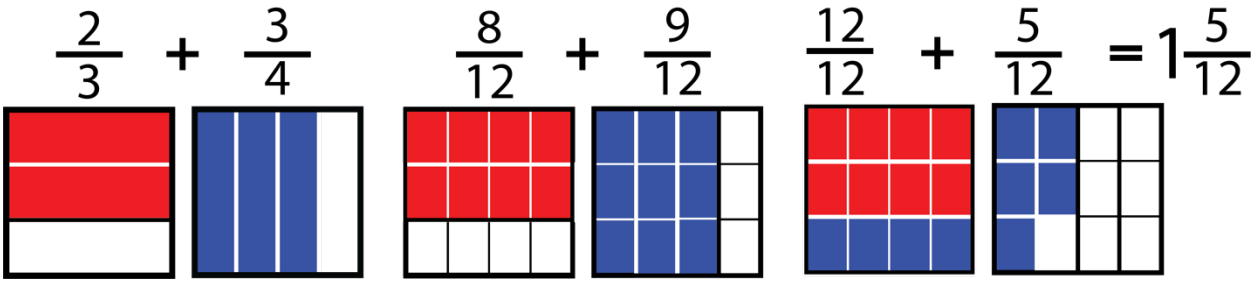
Now that we know the new fractions, renamed twelfths, we can easily add them. We turned the second fraction so that the rectangles are all shaped the same and we can easily see that they are all the same size.



To reinforce this skill there is a fun game called Renaming Fractions Twizzler Game on page 38 of the Games section of this book.

Improper Fractions

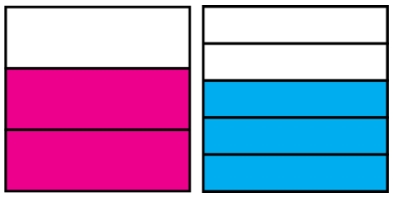
If you were to cut out all the rectangles in our previous example and move them around you would see that you have enough little rectangles to fill one whole square and five more. This tells us that the answer is not only $\frac{17}{12}$, it is also $1\frac{5}{12}$. The fraction $\frac{17}{12}$ is what we call an **improper fraction**. In an **improper fraction**, the numerator is larger than the denominator. The number $1\frac{5}{12}$ is a **mixed number**. It is a **mix**ture of a whole number and a proper fraction. A **proper fraction** has a smaller numerator than its denominator.



Dividing Fractions

If we go back to talk about the English words represented by mathematical symbols, we could say that "+" means "and". "-" means "take away". We already said that "×" means "of". Finally, "÷" means "separate into sets of". Six divided by two would translate into, "six separated into how many sets of two". To solve it you might ask, "how many sets of two make six?"

With fractions we are separating part of a thing into different parts. It's important to view everything correctly. When considering the problem, $\frac{2}{3} \div \frac{3}{5}$ we ask ourselves, "How many sets of three fifths make two thirds?"

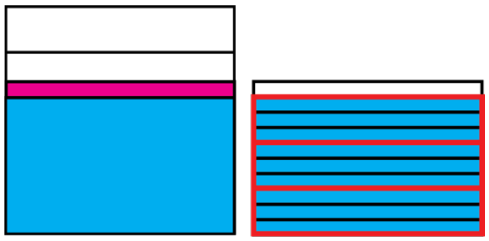


We start by considering what two thirds and three fifths look like.

Then we take the whole squares out of our consideration and simply look at the pieces that are two thirds and three fifths.

When you compare these two you see that the blue one is smaller than the pink one.

To find out how many sets of the blue one are the same as the pink one we'll need to cut up the blue one into pieces. Since there is a pink strip visible in the last image, we'll cut up the blue piece in strips as well. When I decide how many strips to cut it into, I'm going to start with ninths because there were three fifths to begin with and the other fraction is thirds. Three times three is nine.



When we slice up the blue rectangle into ninths, we can see that we need to add one more ninth to make the blue rectangle the same size as the pink one. That's ten ninths. That means we have shown that two thirds divided by three fifths is ten ninths.

I have shown you what dividing fractions is. Now let's talk about how to divide fractions without cutting up our manipulatives. We simply multiply by the inverse.

What does that mean? To take the inverse is to turn the fraction. Make the denominator the numerator and make the numerator the denominator. Then multiply as usual. This gives us the same answer as our manipulatives did!

$$\frac{2}{3} \div \frac{3}{5} = \frac{2}{3} \times \frac{5}{3} = \frac{10}{9}$$

For fun practice with dividing fractions, see the Dividing Fractions Index Card Board Game on page 40 in the Games section.

Important Notes

Do math every day! Do it every school day anyway. I have said this already, but it bears repeating. Math is a language. When learning any language, you must practice every day if you want to retain anything. Math is the same way.

Every concept you learn in Math class builds on concepts you have learned before. Because you are constantly building and learning it's easy to forget new things. If you wait days after learning a new concept to practice it, you will have a hard time.

Here's the best promise I can offer students. Doing math every day will make each lesson go faster and easier. Don't just take my word for it. Try it yourself!

I also want to remind you to learn your multiplication facts from zero to twelve. Many teachers are no longer requiring this because everybody uses calculators. I believe this is a grave mistake.

Calculators are slower than a human brain which already knows the answer. If you have what I affectionately call "fat fingers" and hit the wrong button on your calculator you will get the wrong answer. If you don't know your multiplication facts, you won't know you made the mistake.

Most students with whom I have worked like to get their math done more quickly. Additionally, students who need to take college entrance exams need to save time whenever and wherever they can. Knowing multiplication facts speeds up math like nothing else.

Because I believe so strongly in this, and because so much of working with fractions involves multiplying, I have included a Flash Card Race on page 21 in the Game section of this book. I have also included a Multiplication Chart for practicing multiplication facts. It's on page 77 at the back of this book. If you need more help with memorizing multiplication facts you should try my Multiplication Memory Circles book available at PowerlineProd.com.

I would like to offer a final note about Math games. Believe it or not there is no such thing as cheating in my games. By that I do not mean that cheating is not allowed. I really do mean it does not exist. If students have trouble doing the activity, they sometimes need to watch others do it to figure it out. Let them. Encourage them to do it. Remind them that in the games, this is

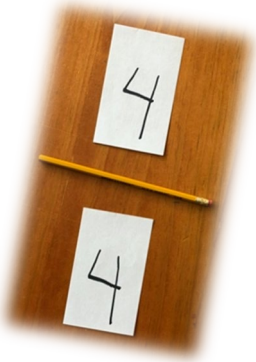
not cheating. Honestly, they can't win the game if they are copying somebody else, so they won't keep doing it any longer than they have to.

I do everything I can to make everybody have fun with these games. They point is to make learning Math fun. When one team is lagging behind, I throw out prizes to everybody so that nobody is left empty handed. I cheer and help and encourage everybody else to cheer and help one another. Brainstorm with the students if somebody is really struggling. Especially if they are embarrassed. Make it fun and a team building or family building experience.

Most kids are naturally competitive and will want to do well. They will want to keep score too. Just remind everybody why you're playing the games. Make sure nobody forgets that these are not the kinds of games where anybody needs to learn how to be a good winner or loser. We're all just trying to learn Math without being bored.

Games


ONE BIG STORY
BIBLE MEMORY MATCH GAME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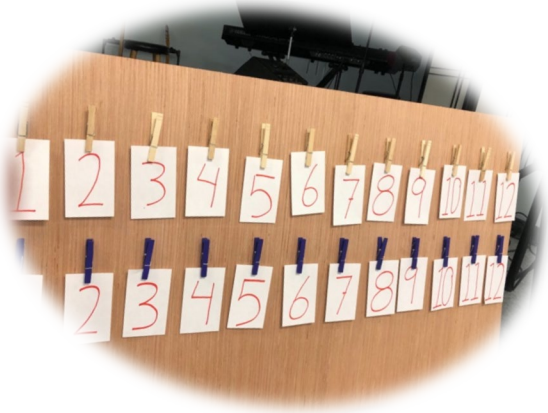

1 2 3 4 5 6 7 8 9 10 11 12
2 3 4 5 6 7 8 9 10 11 12


1 2 3 4 5 6 7 8 9 10 11 12
1 2 3 4 5 6 7 8 9 10 11

Flash Card Race

Supplies:

Multiplication Facts Cards
Prizes (Personal Size Candies Work Great)

Setup:

Position a teacher/judge in the middle of the long side of a 6'-9' table. Leave enough room on the other side of the table for the students to line up 5' away from the table. Either leave the prizes on the table for the one teacher/judge to hand out prizes or have another teacher hold the prizes and toss them to the winners before they leave the table.

How to Play:

Divide the students into two equal size teams. Have them line up at least 5' from the table. One team on the left of the teacher/judge. One team on the right. When play begins, the first pair of students will step up to the table. The teacher/judge shows a flashcard. The first student to yell out the correct answer wins a prize. As soon as they collect their prize, the students run to the end of the line and the next pair of students step up to take a turn.

Construction Paper Fraction Game

Supplies:

Pieces of colorful construction paper cut to 11-6”x6”, 7-7”x7”, 14-8”x8”, 12-9”x9”, 17-10”x10”, 11-11”x11”
Newsprint, Brown Craft Paper, Freezer Paper or any other really large paper you can draw on
78-Index Cards
2-12” Rulers
2 Pencils
2 Scissors
Black Large Marker
Prizes

Setup:

Draw 2-6”x6”, 2-7”x7”, 2-8”x8”, 2-9”x9”, 2-10”x10”, and 2-11”x11” squares on the large paper with the marker. Lay it on a 6-8’ long rectangle table where everybody can see. This is the Display Table.

With the black marker, write on one side of each index card the dimensions of the brightly colored construction paper squares, 6”x6”, 7”x7”, 8”x8”, 9”x9”, 10”x10”, 11”x11”. These will be used to label the piles of squares. Also write on each of the rest of the index cards a fraction from the list below.

$3\ each -\ \frac{1}{2}\ \ \&\ \ \frac{2}{2}$

$2\ each -\ \frac{1}{3}\ \frac{2}{3}\ \frac{3}{3}$

$1\ each -\ \frac{1}{4}\ \frac{2}{4}\ \frac{3}{4}\ \frac{4}{4}\ \frac{1}{5}\ \frac{2}{5}\ \frac{3}{5}\ \frac{4}{5}\ \frac{5}{5}\ \frac{1}{6}\ \frac{2}{6}\ \frac{3}{6}\ \frac{4}{6}\ \frac{5}{6}\ \frac{6}{6}\ \frac{1}{7}\ \frac{2}{7}\ \frac{3}{7}\ \frac{4}{7}\ \frac{5}{7}\ \frac{6}{7}\ \frac{7}{7}$

$\frac{1}{8}\ \frac{2}{8}\ \frac{3}{8}\ \frac{4}{8}\ \frac{5}{8}\ \frac{6}{8}\ \frac{7}{8}\ \frac{8}{8}\ \frac{1}{9}\ \frac{2}{9}\ \frac{3}{9}\ \frac{4}{9}\ \frac{5}{9}\ \frac{6}{9}\ \frac{7}{9}\ \frac{8}{9}\ \frac{9}{9}\ \frac{1}{10}\ \frac{2}{10}\ \frac{3}{10}\ \frac{4}{10}$

$\frac{5}{10}\ \frac{6}{10}\ \frac{7}{10}\ \frac{8}{10}\ \frac{9}{10}\ \frac{10}{10}\ \frac{1}{11}\ \frac{2}{11}\ \frac{3}{11}\ \frac{4}{11}\ \frac{5}{11}\ \frac{6}{11}\ \frac{7}{11}\ \frac{8}{11}\ \frac{9}{11}\ \frac{10}{11}\ \frac{11}{11}$

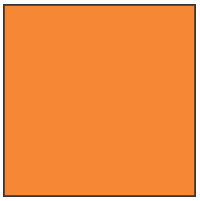
Stack the index cards in a pile then shuffle them well.

Set up a second 6-8’ long rectangle table, perpendicular to the other table and at least 5’ away from it. On this table place the 2 scissors, 2 rulers, and 2 pencils. Place each stack of construction paper squares, with their index card labels taped to the table in front of them,

across the far edge of the table. Also put the stack of index cards, number sides down, in the center of the far edge. This is The Worktable.

How to Play:

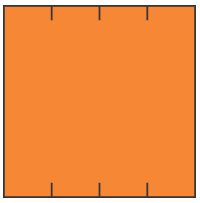
You will need one teacher/judge to stand at the far end of the Display Table and one at the far side of the Worktable (in front of the stack of index cards) so that they are facing each other, and consequently all the contestants. Two students stand at the inside edge of the Worktable. The teacher/judge with the index cards flips over the top one. Each student takes a square that can be divided evenly into strips to make that fraction. The strips will be full inches wide. For example, they would be 1", 2", or 3" wide.



For example, if the Index Card says, "$\frac{3}{4}$", then the student will take one 8"x8" piece of construction paper.

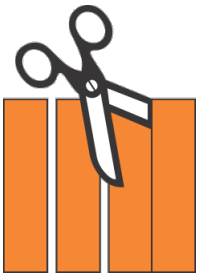
The most obvious choice may no longer be available. When that happens students must think of another size square that will work. To build "$\frac{1}{2}$" they could use the 6"x6", 8"x8", or the 10"x10" by cutting 3", 4", or 5" wide strips.

Using a ruler, they will mark off, and draw with a pencil cut lines so that the square can be cut into even strips. Make sure to cut them all, not just the ones you need. They will be saved for use in other games.



For example, to be able to cut an 8"x8" piece of construction paper into four strips, as would be needed to make the fraction "$\frac{3}{4}$", the student would need to make a pair of marks every two inches, then draw a line connecting the opposing marks.

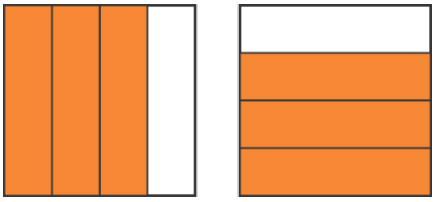
They cut the strips then carry the correct number of strips to the Display Table and line the strips up in the correct square on their side of this table.



For example, the student would cut three of the strips from the 8"x8" piece of construction paper that are 2" wide and carry them to the Display Table.

It doesn't matter which direction the strips are facing, as long as they are lined up all touching as if they were one piece again.

The student to forms the correct fraction on the Display Table first wins a prize.



**** Remember: don't mutilate the strips. They will be used in other games.

The Name Game

Supplies:

1-Deck of Memory Game Cards or Go-Fish Cards or a Standard Playing Cards
Team Prizes

Setup:

Set up a 6'-8' with a chair in the middle of one of the long sides. This is where the teacher/judge will sit and judge the game. Shuffle the cards then place them face down in evenly spaced rows and columns in the center of the table.

How to Play:

Divide the students into two equal teams. Have them line up according to age. The oldest goes first and the youngest goes last. Have them stand on the side of the table opposite from the teacher/judge. Have the first pair of students step up to the table. Start with the oldest of the pair. Have them select two cards and turn them over. If the cards have the same name, they must set the pair near the far edge on their side of the table and flip over two more cards. If the cards don't match this student must turn them back over (face down) and move to the back of the line. The student from the other team then gets a chance to turn over two cards.

Play continues in this manner until all the pairs are found. It is important for all students to watch carefully as each pair of cards are flipped over. The team with the most pairs of cards wins the team prize.

Adding Fractions Board Game

Supplies:

Colored Foam Board, Approximately 24”x36”
Game Spaces & Game Board Decorations found on following pages
100 Unruled 3”x5” Index Cards
2 Different Color Dice, A Move Die and A Multiplier Die
Bell or Buzzer, or Toy Drums, Bells, Triangles, or Pianos, or voices saying, “Ding” and “Buzz”
Tokens
Glue Sticks
Thick Permanent Marker

Setup:

Print and cut out the Game Board Spaces found on the following pages. Shuffle the game spaces then glue them to the foam board in a winding path, or in a spiral path, making sure to leave space for the Game Board Decorations found on page 35. Color, cut out, and glue the Start and Finish markers at the beginning and end of the path. Cut out and glue the playing cards placeholders anywhere on the board.

Make playing cards by writing a fraction on each index card. Use the same ones as appear on the game spaces. Shuffle them up and stack them on the Draw Pile placeholder on the game board.

How to Play:

Begin play by dealing five playing cards to each player. The youngest player starts the game and turns will progress clockwise around the board. When it’s your turn, you will:

1. Draw a card
2. Roll both dice and move the number of spaces on the top of the Move Die
3.
    a. If you can add one of your fractions to the fraction which appears on the space where you land (same denominator), move forward one space.
    b. If you name the fraction correctly that you get when you add these two fractions, move forward another space.
    c. If you couldn’t add any of your fractions to the fraction on the space but you can use the number rolled on the Multiplier Die to rename one of your cards and add to the fraction on the space move forward two spaces.
    d. If you can name the fraction correctly that you get when you add these two fractions, move forward another space.

e. If you cannot do any of those things, do not move. The first opponent who hits the bell/buzzer and can add their card to that fraction on the space where you had landed and gives the correct fraction when they are added moves forward two spaces from their spot or yours, whichever is farthest.

4. Discard a card to finish your turn

If all the Draw Pile cards are used before the end of the game, shuffle the discarded cards and put them back in the Draw Pile.

Whoever gets to the finish place first wins. You do not have to get the roll exact to reach this space.

Quiet Variation: If you want a quieter game, have the players raise their hands instead of using a noisemaker.

Game Board Spaces

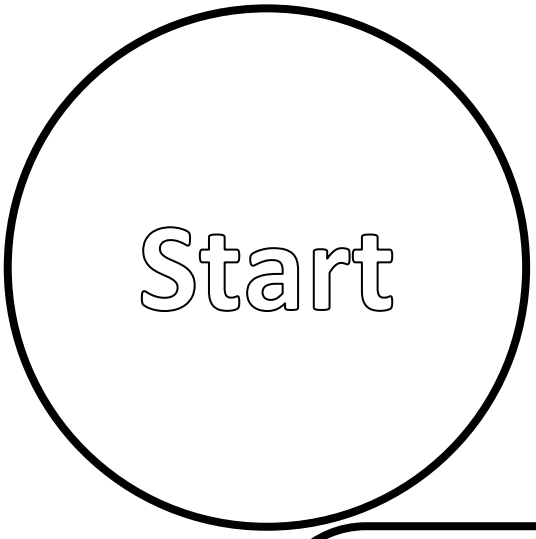
$\frac{1}{2}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{4}$
$\frac{2}{4}$	$\frac{3}{4}$	$\frac{1}{5}$	$\frac{2}{5}$
$\frac{3}{5}$	$\frac{4}{5}$	$\frac{1}{6}$	$\frac{2}{6}$
$\frac{3}{6}$	$\frac{4}{6}$	$\frac{5}{6}$	$\frac{1}{7}$
$\frac{2}{7}$	$\frac{3}{7}$	$\frac{4}{7}$	$\frac{5}{7}$

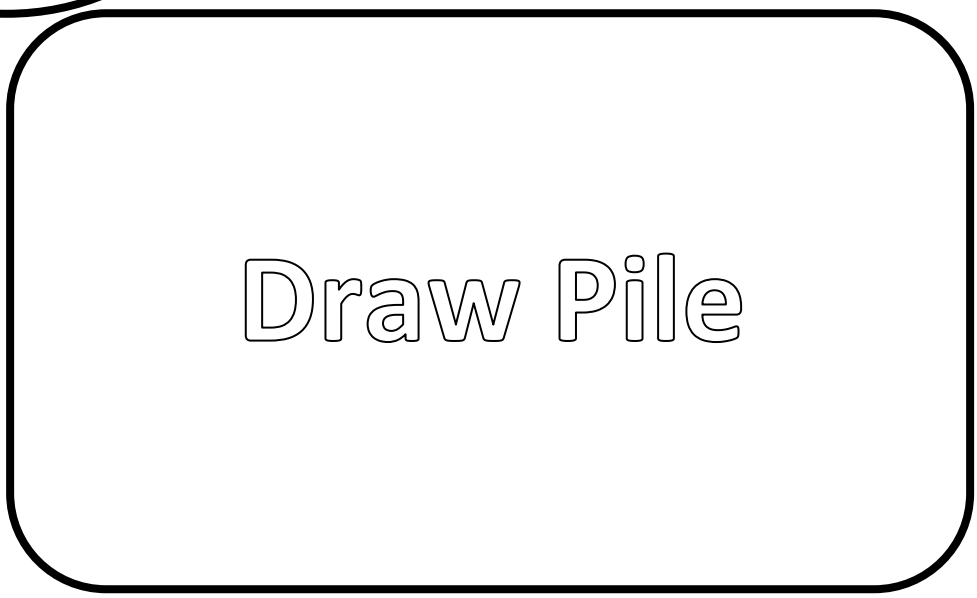
$\frac{6}{7}$	$\frac{1}{8}$	$\frac{2}{8}$	$\frac{3}{8}$
$\frac{4}{8}$	$\frac{5}{8}$	$\frac{6}{8}$	$\frac{7}{8}$
$\frac{1}{9}$	$\frac{2}{9}$	$\frac{3}{9}$	$\frac{4}{9}$
$\frac{5}{9}$	$\frac{6}{9}$	$\frac{7}{9}$	$\frac{8}{9}$
$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{4}{10}$

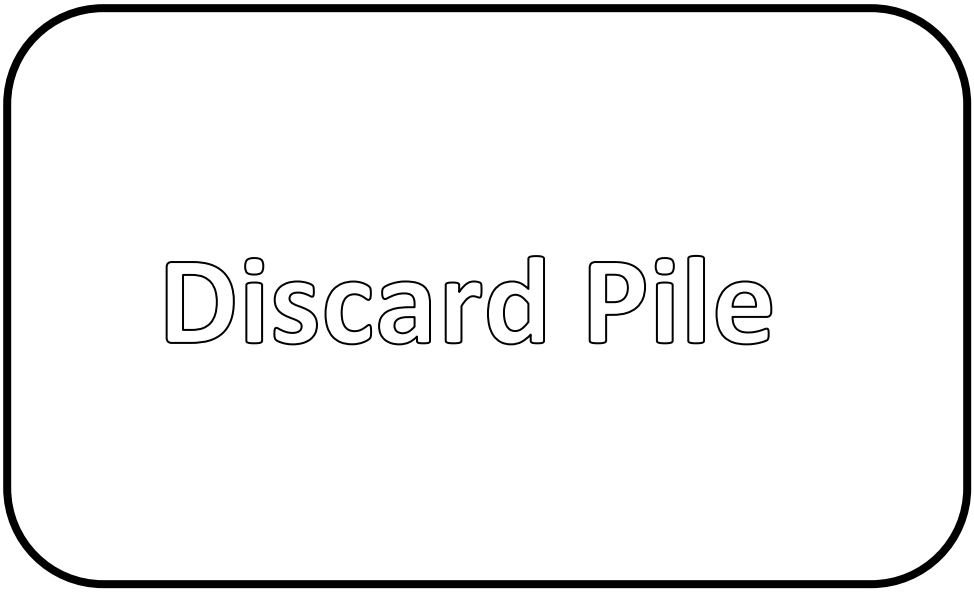
$\frac{5}{10}$	$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$
$\frac{9}{10}$	$\frac{1}{11}$	$\frac{2}{11}$	$\frac{3}{11}$
$\frac{4}{11}$	$\frac{5}{11}$	$\frac{6}{11}$	$\frac{7}{11}$
$\frac{8}{11}$	$\frac{9}{11}$	$\frac{10}{11}$	$\frac{1}{12}$
$\frac{2}{12}$	$\frac{3}{12}$	$\frac{4}{12}$	$\frac{5}{12}$

$\frac{6}{12}$	$\frac{7}{12}$	$\frac{8}{12}$	$\frac{9}{12}$
$\frac{10}{12}$	$\frac{11}{12}$	$\frac{1}{2}$	$\frac{1}{3}$
$\frac{2}{3}$	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$
$\frac{1}{5}$	$\frac{2}{5}$	$\frac{3}{5}$	$\frac{4}{5}$
$\frac{1}{6}$	$\frac{2}{6}$	$\frac{3}{6}$	$\frac{4}{6}$

Game Board Decorations

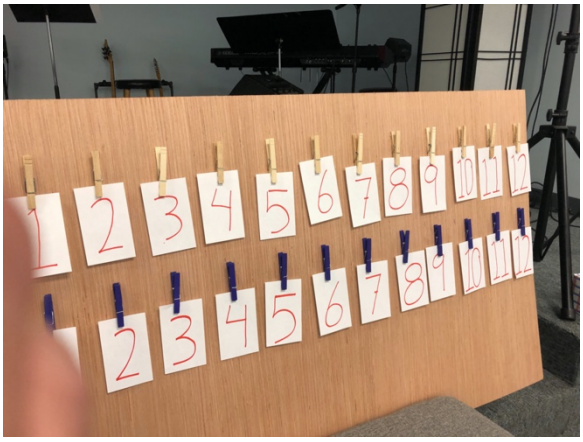






Making One with Fractions

Supplies:



2-3'x4' Very Thin Plywood
48 Clothes Pins
72 Unruled 3"x5" Index Cards
Thick Black Permanent Marker
2 Pencils or Pens
Hot Glue Gun with Glue Sticks
Team Prizes

Setup:

Write numbers 1-12 as large as possible on separate index cards. You will need six of each number. Using the hot glue gun, glue a clothes pin, grabbing side down, about 4" from the top of one of the long sides of the plywood at 2", 6", 10", 14", 18", 22", 26", 30", 34", 38", 42", and 46" from the left side. In other words, spaced evenly across the long side of the board. Glue another 12 clothes pins 10"-12" below the first. Repeat for second board.

Prop the boards up on chairs or easels at one end of a room. Leaving about 6' in between them. Clip index cards with 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 on them. For an increased level of difficulty, put them in random order. A teacher/judge will stand or sit in between the Index Card Boards with the remaining numbered index cards. Make sure to shuffle (mix up) these index cards so they are not in any order. Place a 6'-8' long table about 5' away from the boards and running parallel to them. Place two pencils or pens on the table.

How to Play:

The teacher/judge sitting between the index card boards shows one of the index cards with a number written on it. The students run to index card boards and grab digits to make a fraction equal to "one", with the number shown by the teacher. They next form the fraction on a table using a pencil or pen as the fraction line. For example, if the teacher/judge shows a 4 then the will grab two 4s, run to the table and lay down an index card with the number 4 on it then place a pencil under it and place the second index card under that.

The first student to form the fraction correctly wins a prize.

Renaming Fractions Twizzler Game

Supplies:

Large piece of paper from the Construction Paper Fraction Game which has the outlines of the 6”x6”, 7”x7”, 8”x8”, 9”x9”, 10”x10”, and 11”x11” squares
The Fraction Strips made in the Construction Paper Fraction Game
Quart Size and Gallon Size Zip Storage Bags
Wide Permanent Marker
50 Sheets of Letter Size Printer Paper
48’ Nylon Red or Black Rope (About the Same Thickness as a Licorice Rope)
6 Cups
Lighter or Matches
2 Bells or Buzzers
Fun Size Twizzler Candy Prizes

Setup:

If you hadn’t already done so, put in separate zip bags, the strips from each cut up square saved from the Construction Paper Fraction Game. For example, one zip bag will contain 3 strips of a 6”x6” construction paper square. Label each bag with a permanent marker according to the fraction it represents. For example, the bag described above with a 6”x6” construction paper square cut into three strips will be labeled “$\frac{3}{3}$”.

Using the wide permanent marker write fractions times the very special renaming version of one on the printer paper in very large numbers. Use the fractions listed for the Construction Paper Fraction Game on page 22 and use the numbers 2-6 as the very special renaming version of one. For example, one paper will say, “$\frac{5}{6} \times \frac{2}{2}$.” Shuffle these papers so that there is no pattern to the problems presented.

Cut the rope into 10-6” pieces, 10-7” pieces, 10-8” pieces, 10-9” pieces, 10-10” pieces, and 10-11” pieces. Quickly melt the end of each piece with a flame to keep them from unravelling.

Spread the zip bags filled with fraction strips on a 6’-8’ table. Spread the large piece of paper with the square outlines on a second 6’-8’ table placed perpendicular to the first table and set 5-10’ away from it. Place the cups between the pairs of squares on this paper. Drop the 6” ropes in the cup between the 6”x6” squares. Continue in this pattern for all the ropes and squares. Place a bell or buzzer at the far end of the second table, lined up with the squares.

Position one teacher/judge at the middle of the first table facing all the tables. Position a second teacher/judge at the far end of the second table, beyond the bells or buzzers.

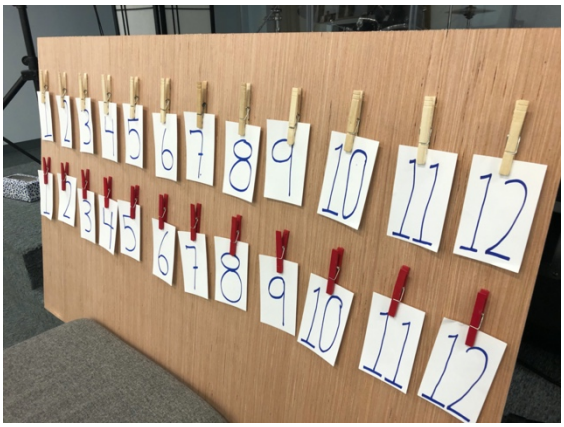
How to Play:

Divide the students into pairs of competitors. The first pair will stand halfway between the tables, facing the first table and the first teacher/judge. The first teacher/judge shows the pair of students one of the "Fraction Times One" sheets. Students must find the construction paper square which can make this fraction, carry it to the second table and form the correct fraction on the right size square. The students then quickly pull out the right length and number of rope(s) to lay across their fraction to show that they have multiplied times that number. Students will finally run to the bell/buzzer and hit it. Without looking back at the square, the first student to ring the bell will tell the teacher/judge the renamed fraction. If they are correct, they win the round. If they aren't, the other student gets an opportunity to answer.

For example, if the teacher shows the sheet that says, "$\frac{5}{6} \times \frac{2}{2}$", the students will each grab a bag with sixths in it. They will take out five strips, lay them side by side inside the right size rectangle. Next they will grab one rope from the cup in front of their square and lay it across the middle of all five strips. They will see that they have formed the fraction, $\frac{10}{12}$. Finally, they run to the buzzer and if they ring it first they tell the teacher/judge, "Ten Twelfths!"

Dividing Fractions Index Card Board Game

Supplies:



2-3’x4’ Very Thin Plywood
48 Clothes Pins
48 Unruled 3”x5” Index Cards
Thick Black Permanent Marker
50 Sheets of Letter Size Printer Paper
2 Personal Size White Boards
Dry Erase Markers
2-White Board Erasers
Hot Glue Gun with Glue Sticks
Team Prizes
Space to Run

Setup:

Write numbers 1-12 as large as possible on separate index cards. You will need four of each number. Using the hot glue gun, glue a clothes pin, grabbing side down, about 4” from the top of one of the long sides of the plywood at 2”, 6”, 10”, 14”, 18”, 22”, 26”, 30”, 34”, 38”, 42”, and 46” from the left side. In other words, spaced evenly across the long side of the board. Glue another 12 clothes pins 10”-12” below the first.

With the thick marker write fraction division problems in very large numbers onto the printer paper to be used for the game. Make sure to use only the digits 1-12.

Prop the boards up on chairs or easels at one end of a room. Leaving about 6’ in between them. Clip an index card to each clothes pin. A teacher/judge will stand or sit in between the Index Card Boards with the Fraction Division Sheets. Place a 6’-8’ long table about 5’ away from the boards and running parallel to them. Place two white boards, the dry erase markers, and erasers on the table.

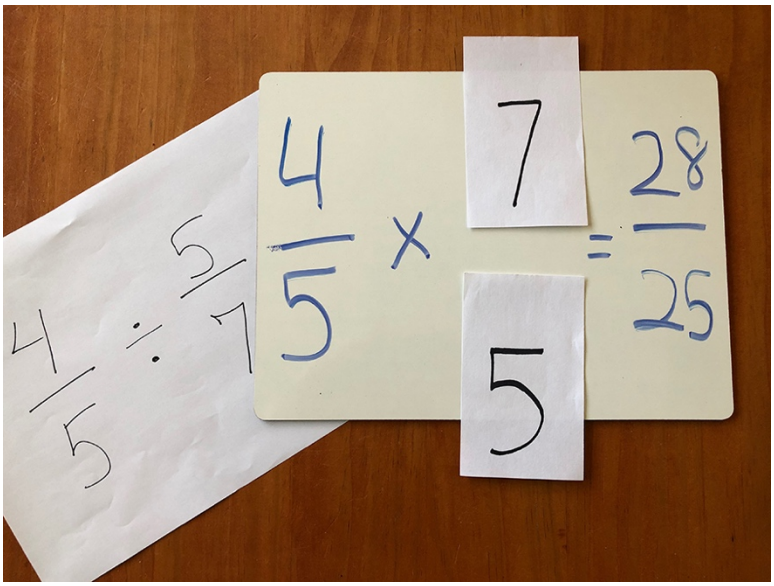
Designate a space to be the Numerator Pin about 10’ in front of one of the Index Card Boards. This is the Numerator Board. Designate another area as the Denominator Pin about 10’ in front of the other Index Card Board. This is the Denominator Board. Divide you students into two team. Each team needs a Numerator, a Denominator, and a scribe. You can play this with as few as 2 students.

How to Play:

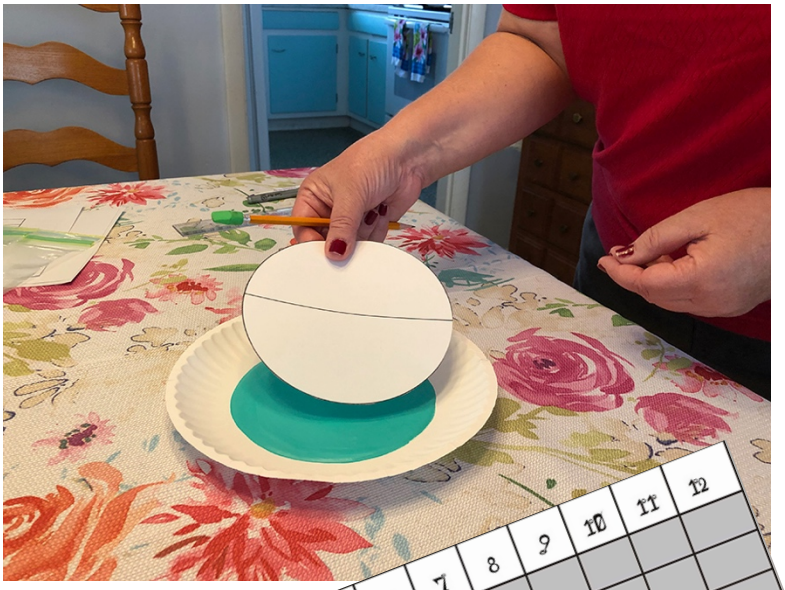
One teacher/judge sits or stands in between the Index Card Boards. They will show the students one of the Fraction Division Sheets. The Numerators will run to their board and grab the index card which matches the numerator of the divisor (the second fraction). The Denominators will

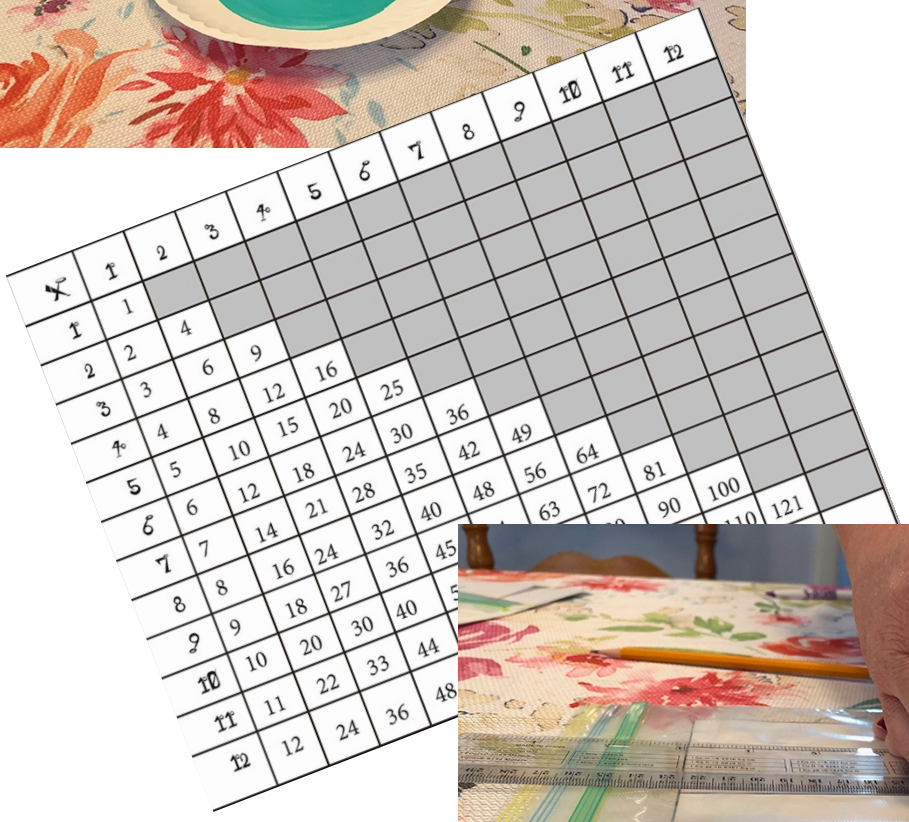
run to their board and grab the index card which matches the denominator of the divisor. They all will run to the worktable. The Numerators and Denominators will trade cards. Then everybody will help the scribe to write out the new multiplication equation placing the cards on the board where they belong. Don't forget to the write the answer. The first team to get the whole equation written with the correct answer wins a prize!

If you only have two players, they will each grab a numerator and denominator and then write the equation.



Templates

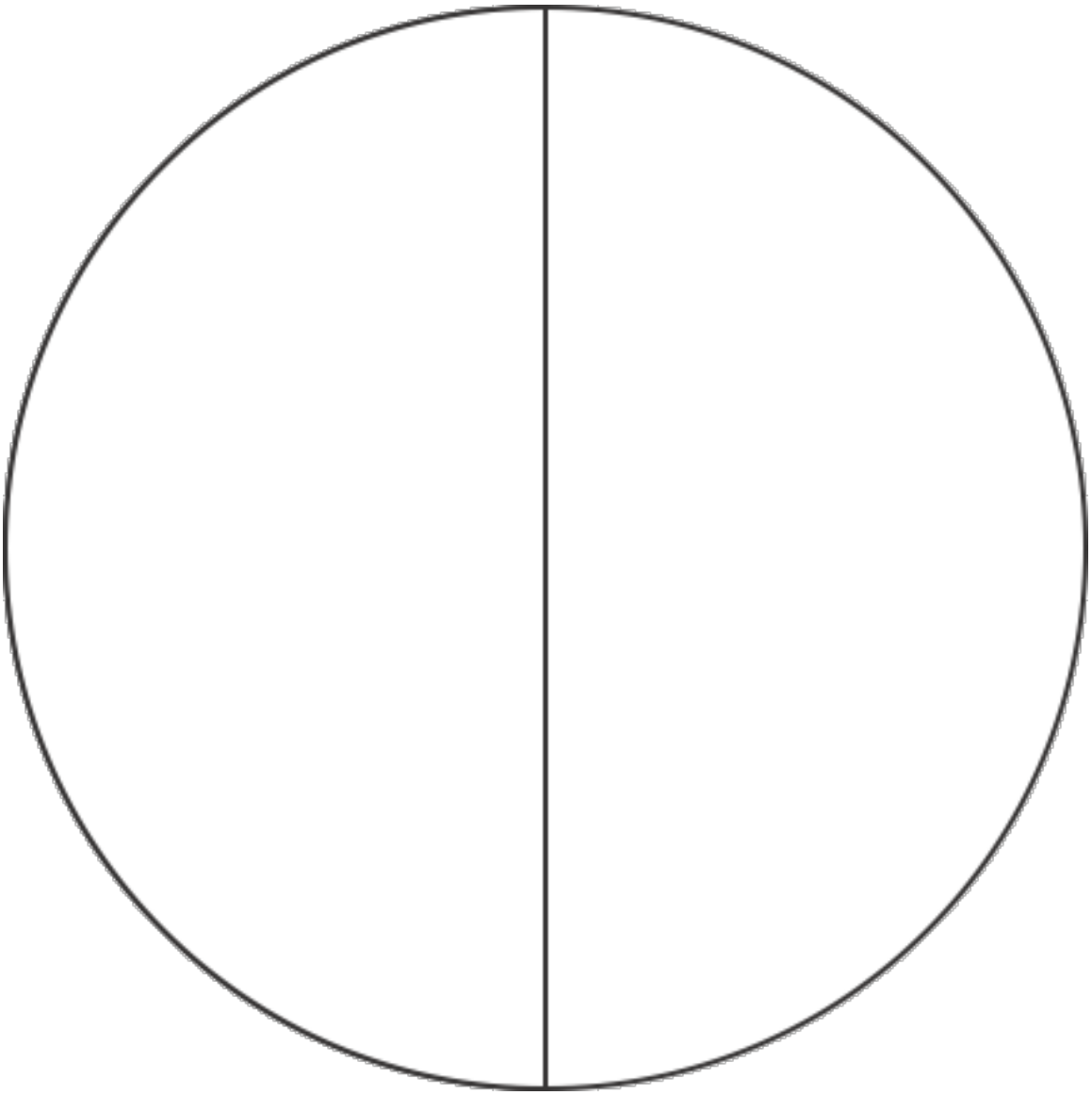




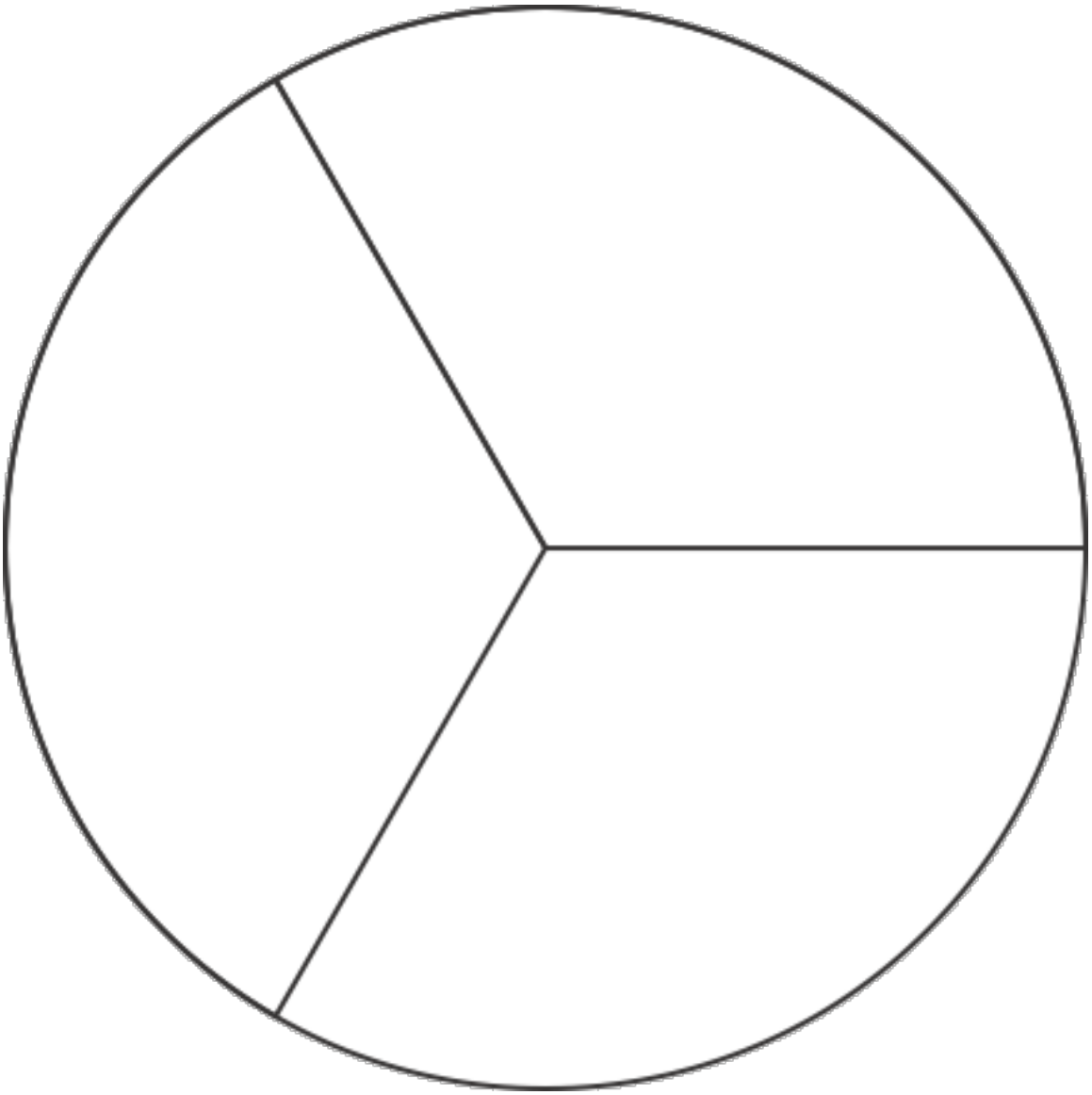
X	1	2	3	4	5	6	7	8	9	10	11	12
1	1											
2	2	4										
3	3	6	9									
4	4	8	12	16								
5	5	10	15	20	25							
6	6	12	18	24	30	36						
7	7	14	21	28	35	42	49					
8	8	16	24	32	40	48	56	64				
9	9	18	27	36	45		63	72	81			
10	10	20	30	40					90	100		
11	11	22	33	44							121	
12	12	24	36	48								

Fraction Circle Templates

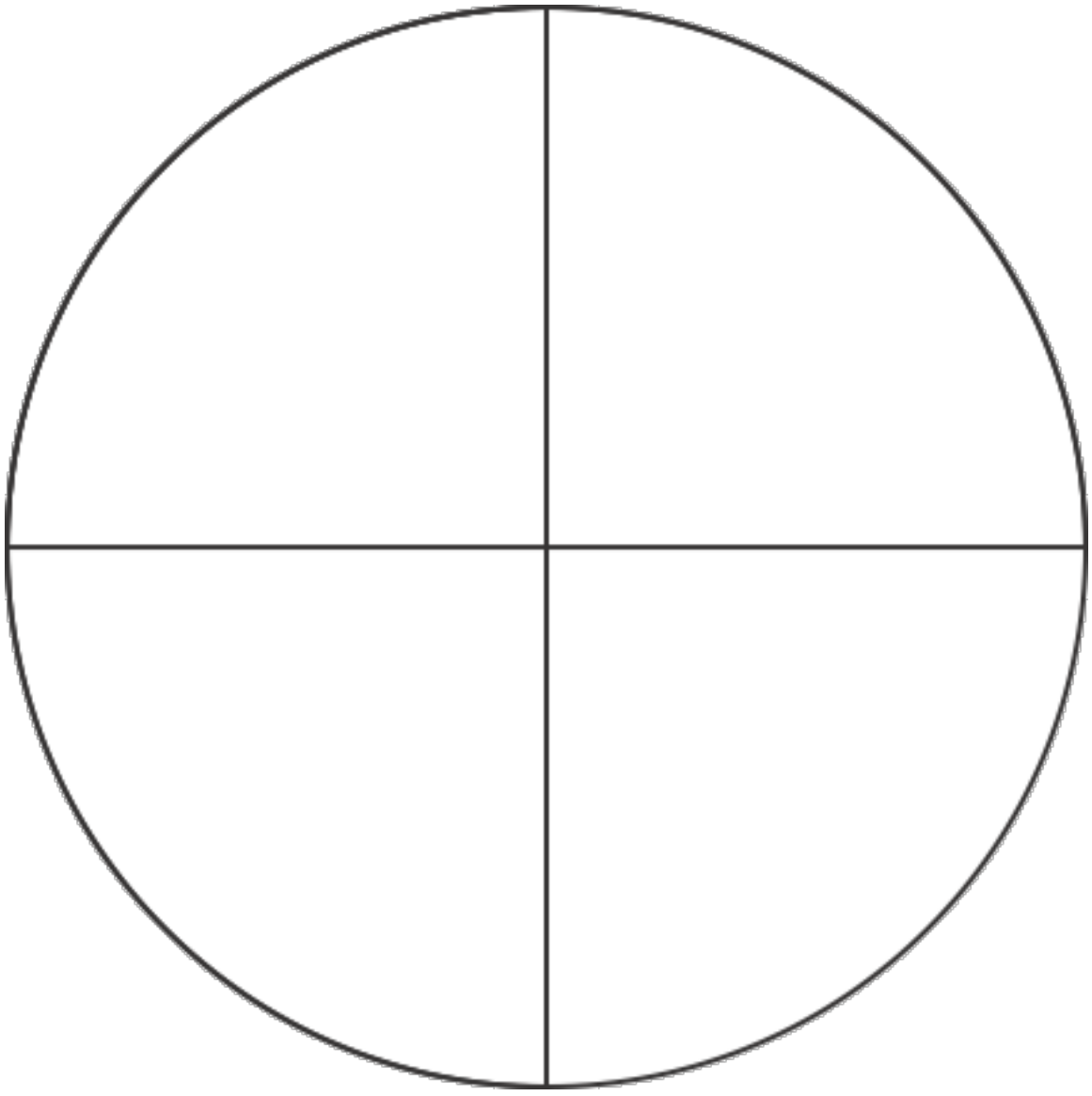
Fraction Circle Template - Halves



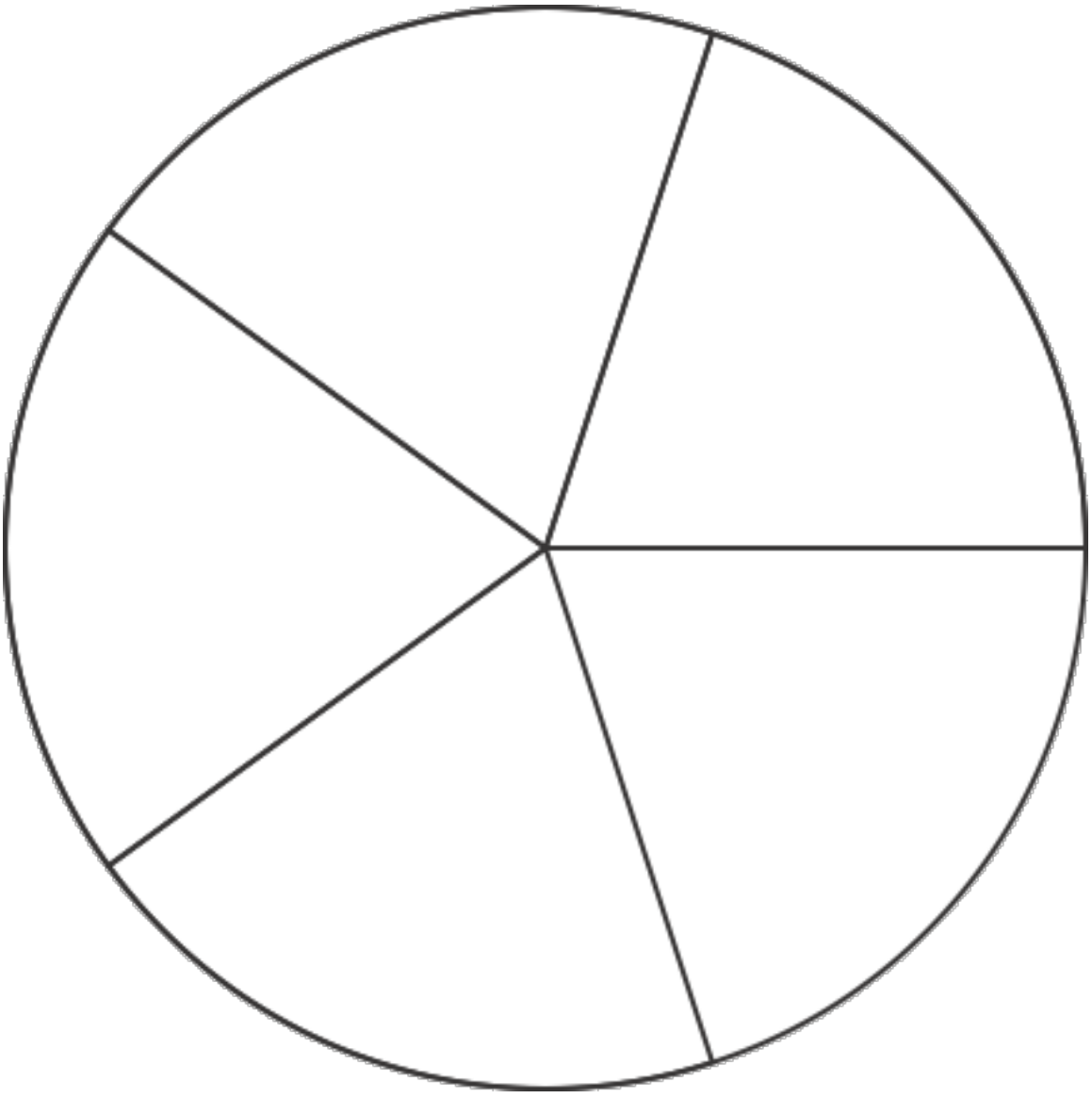
Fraction Circle Template - Thirds



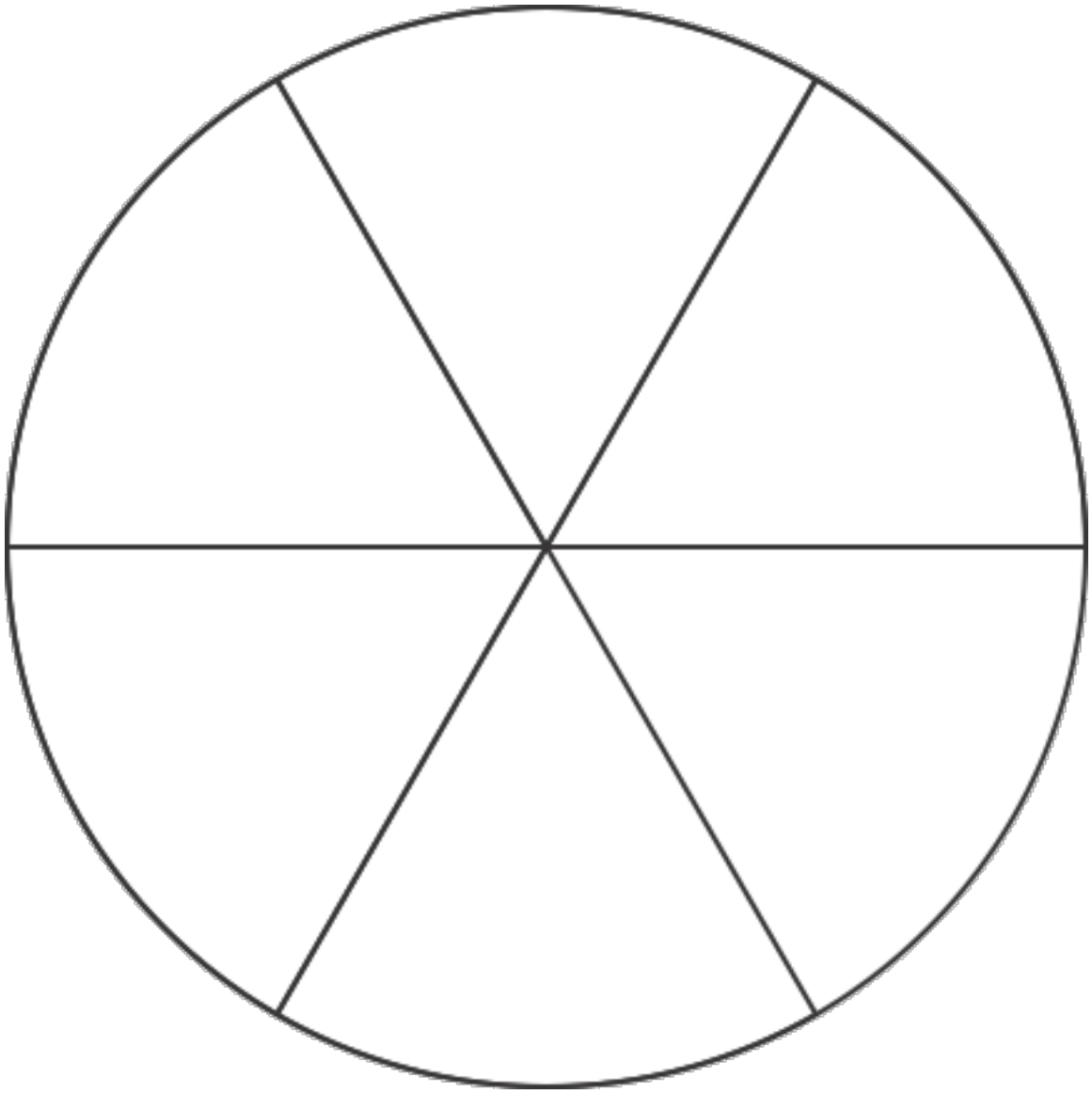
Fraction Circle Template - Fourths



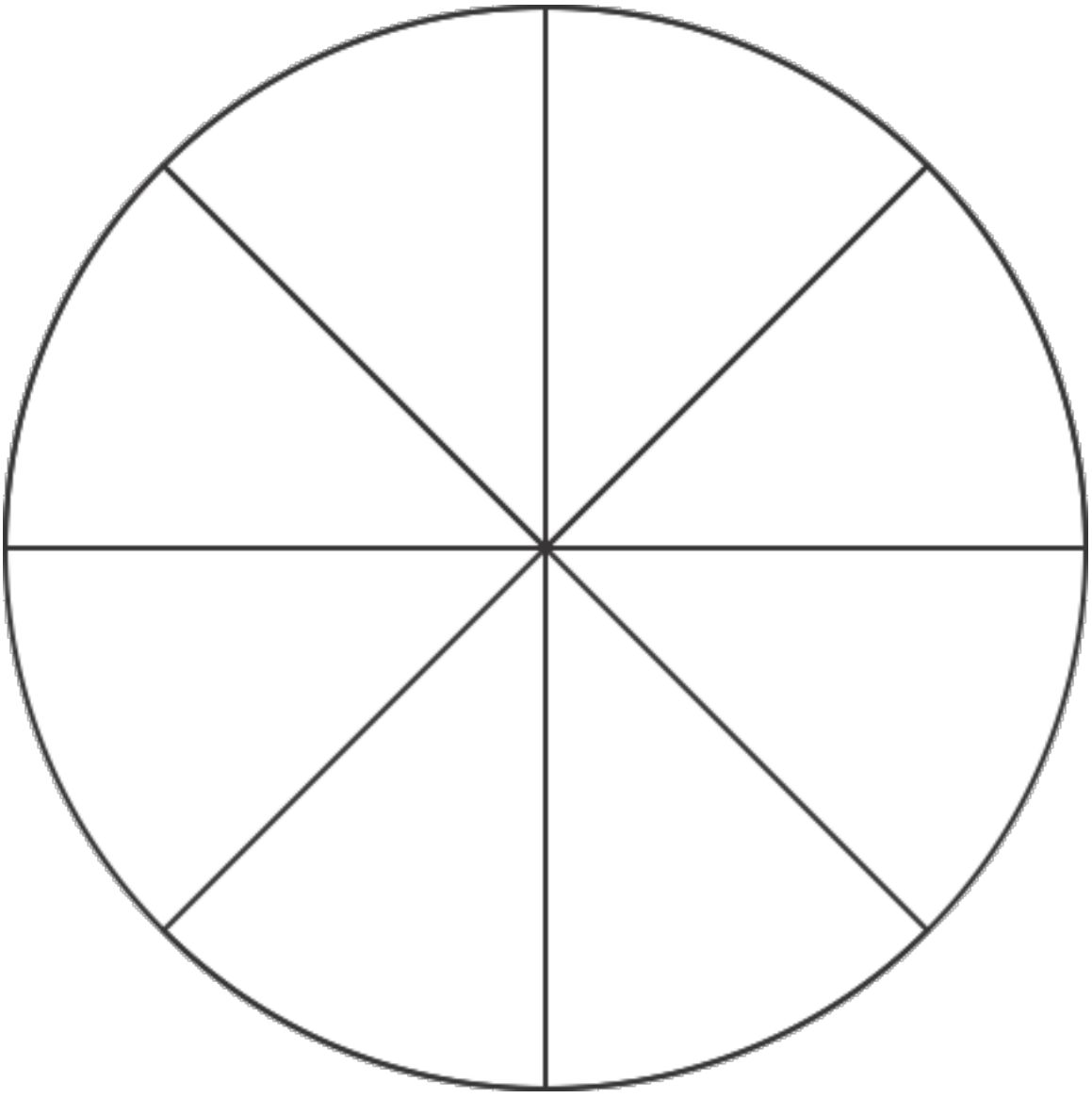
Fraction Circle Template - Fifths



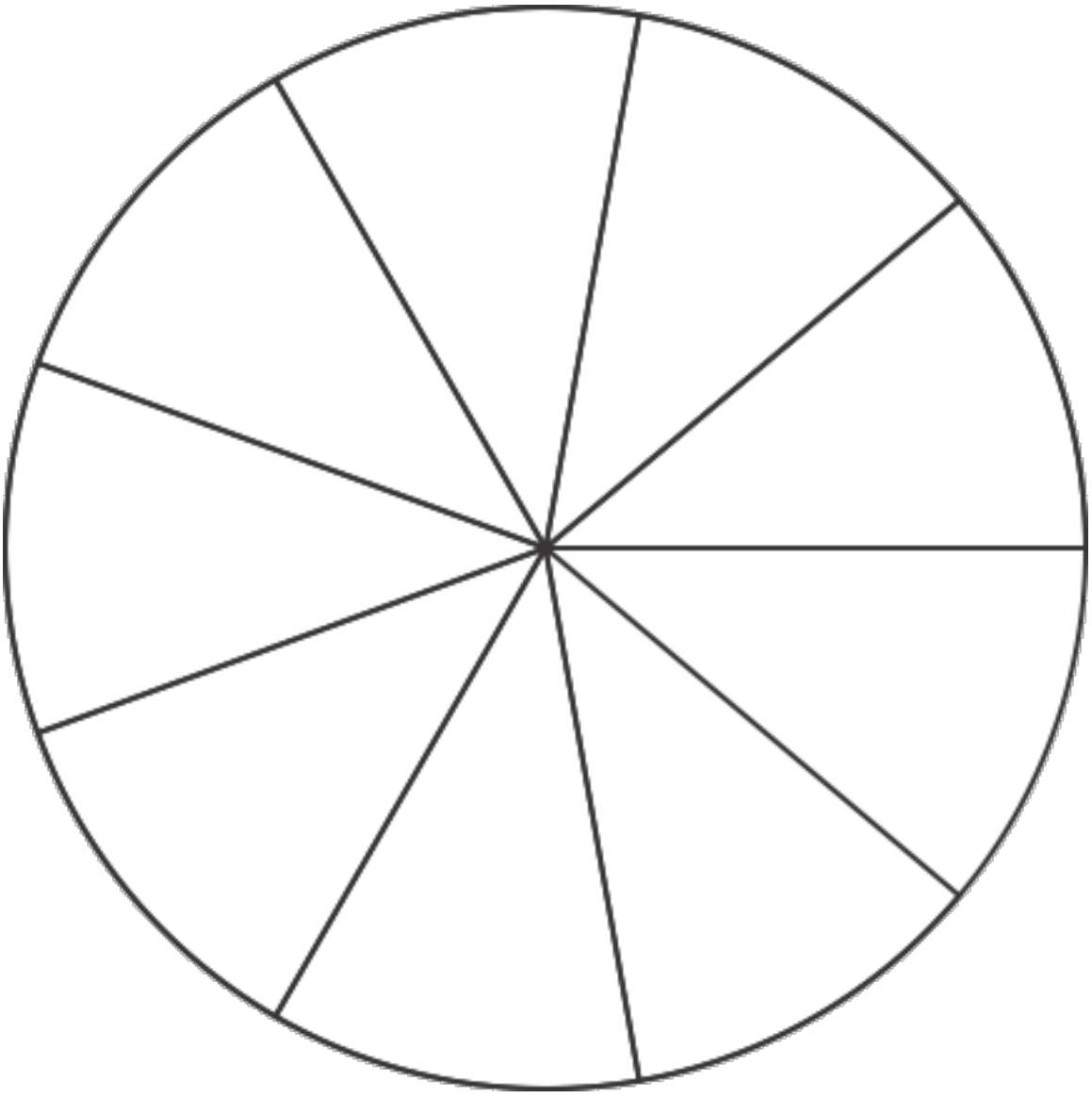
Fraction Circle Template - Sixths



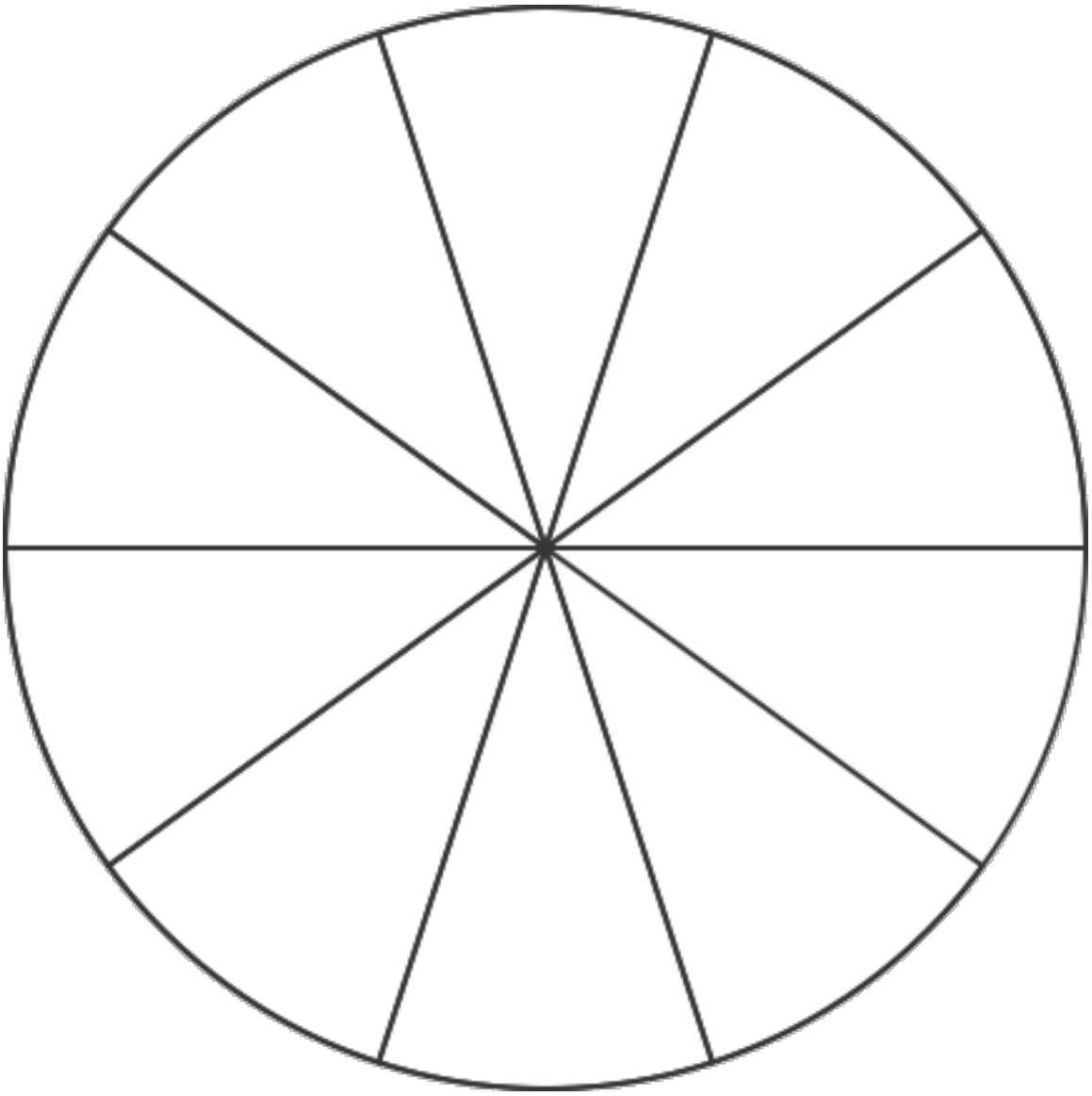
Fraction Circle Template - Eighths



Fraction Circle Template - Ninths

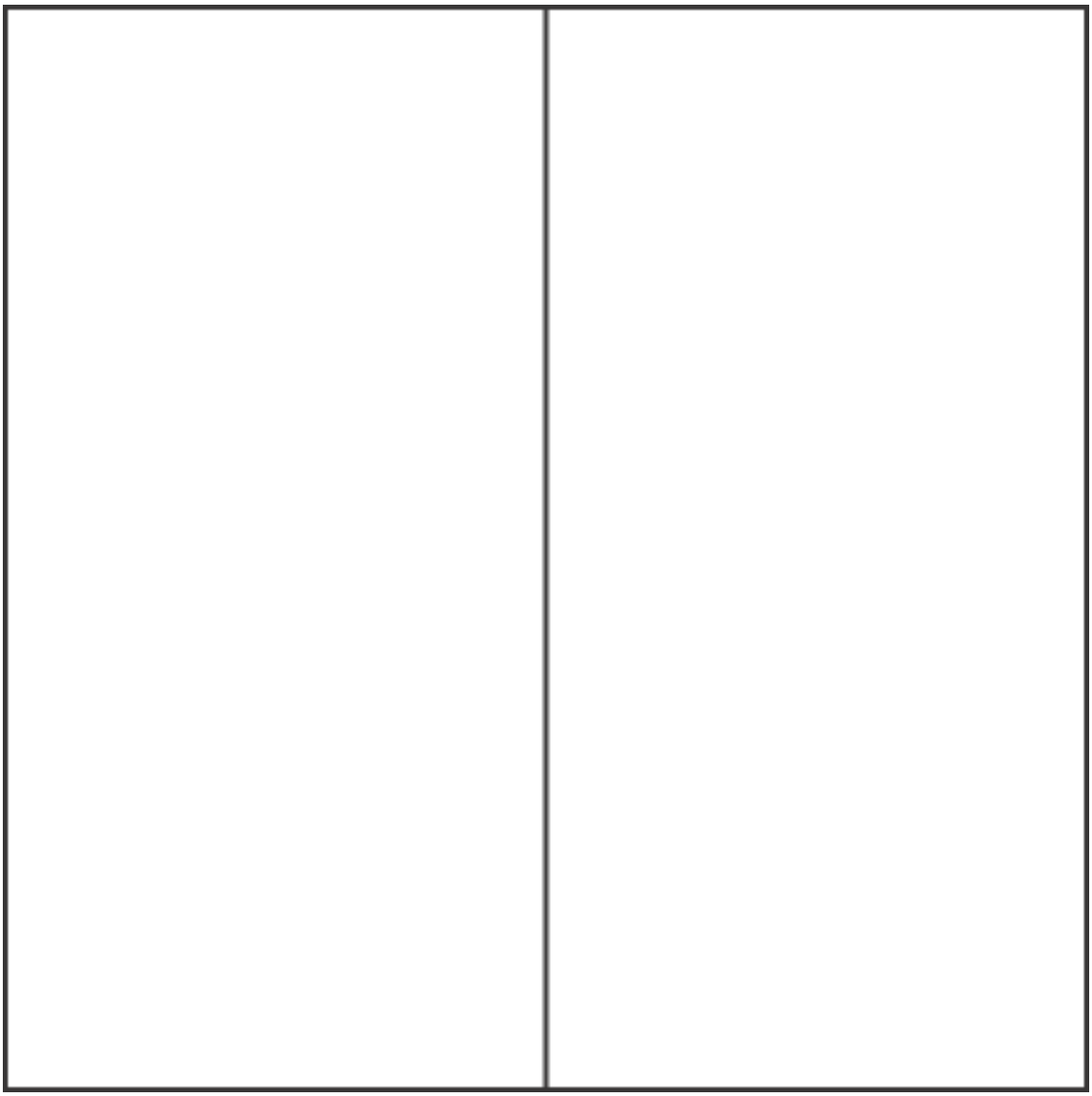


Fraction Circle Template - Tenths

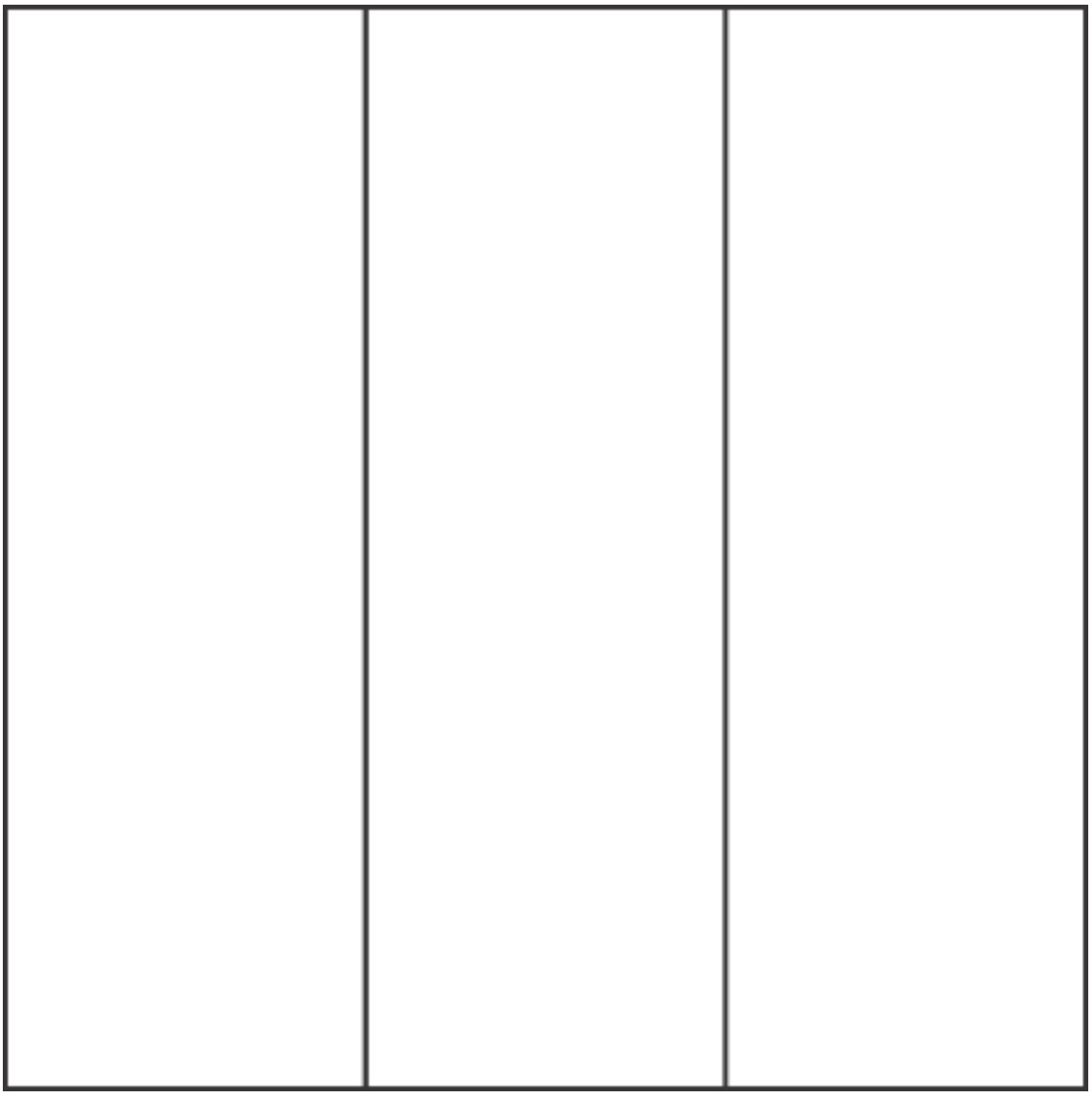


Fraction Square Templates

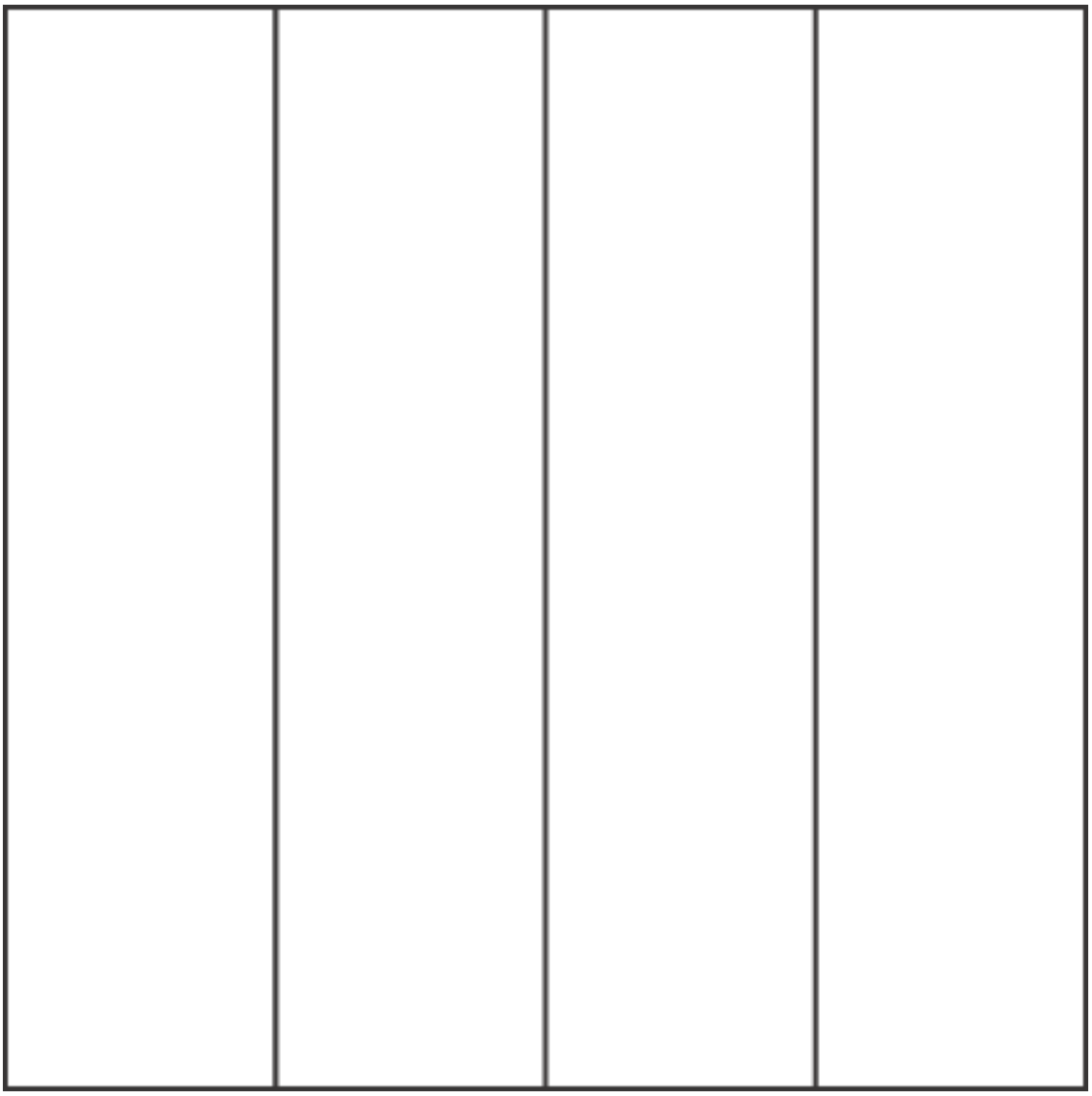
Fraction Square Template - Halves



Fraction Square Template - Thirds



Fraction Square Template - Fourths



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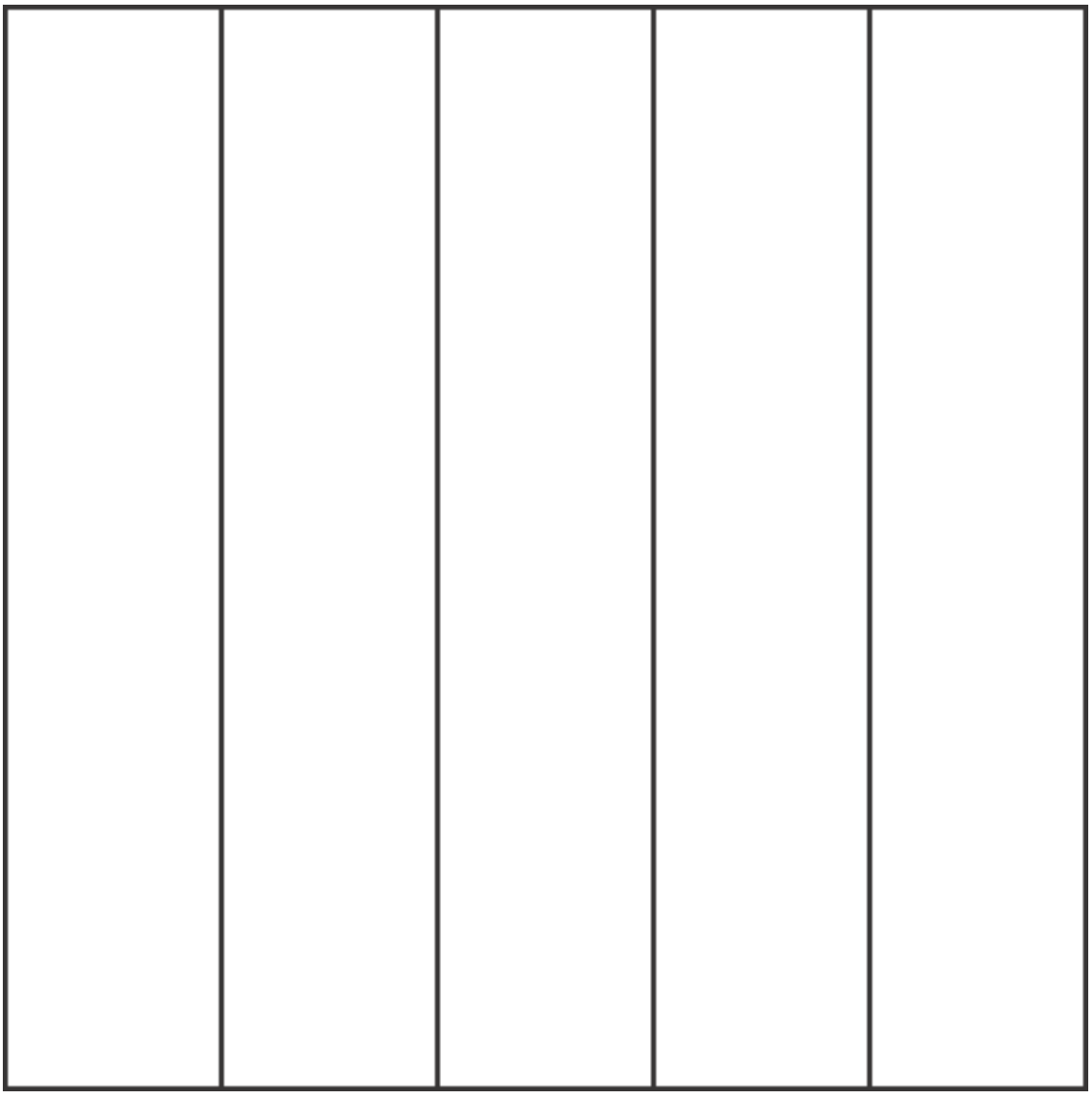
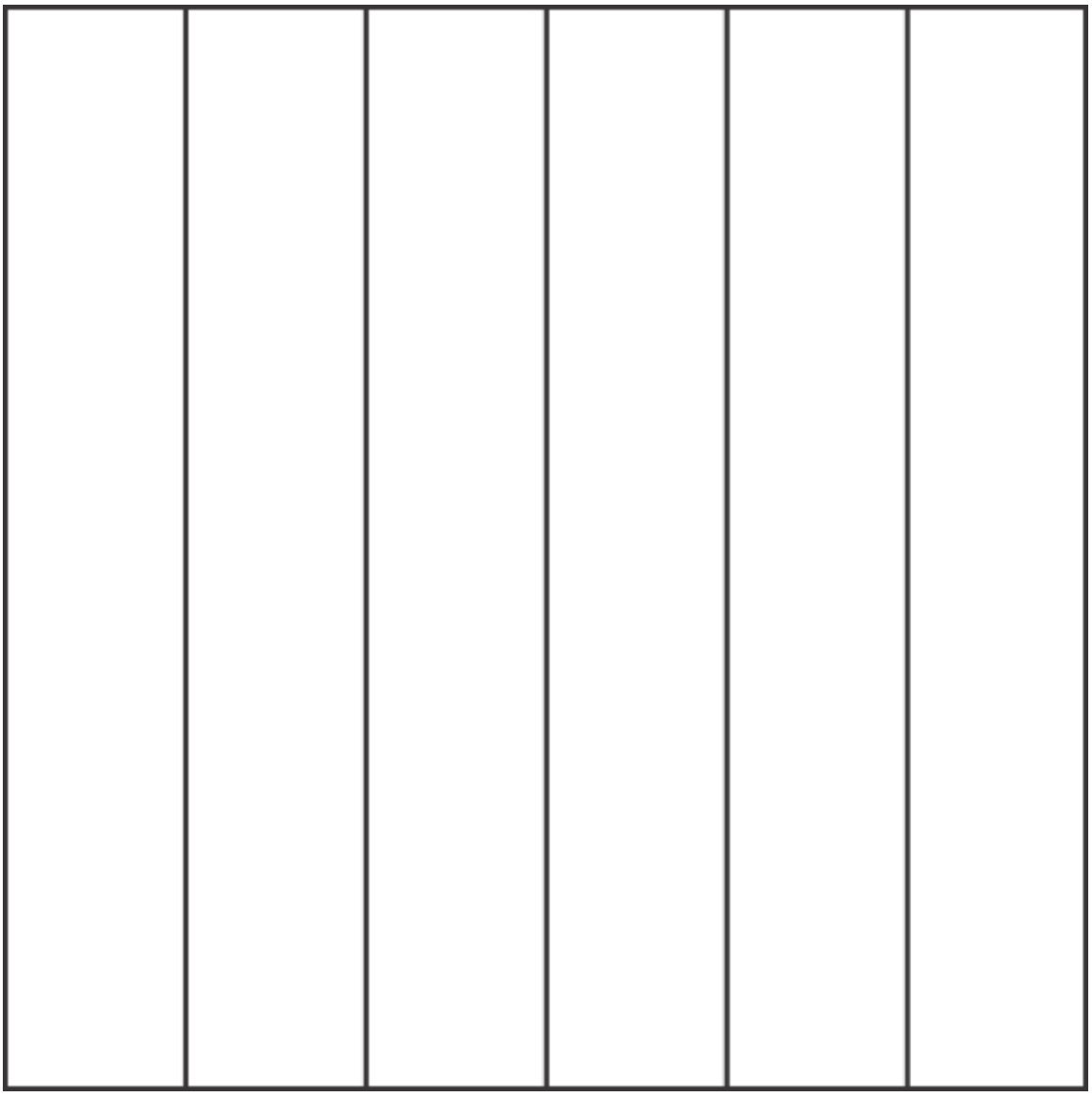


Fraction Square Template - Sixths



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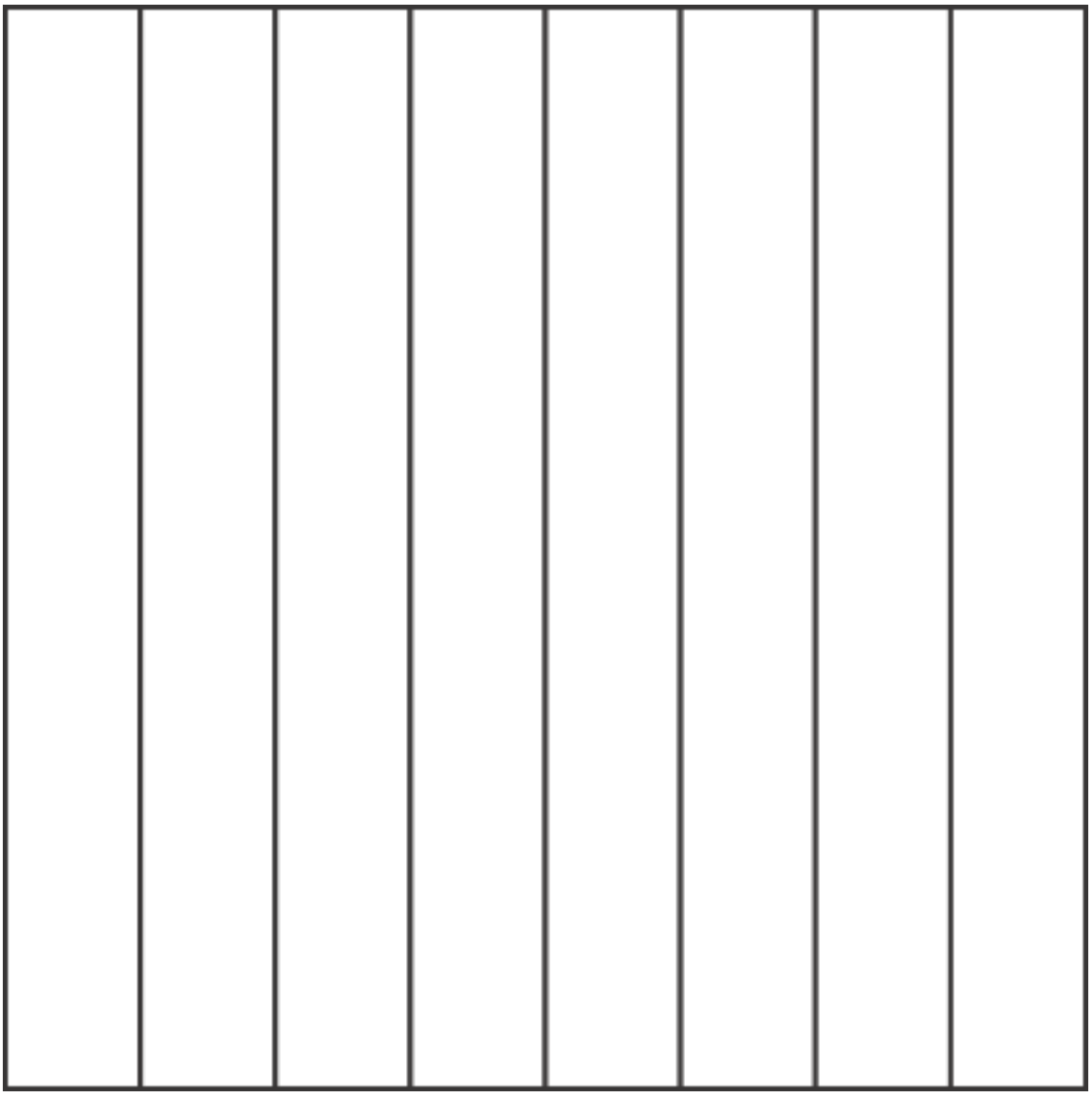
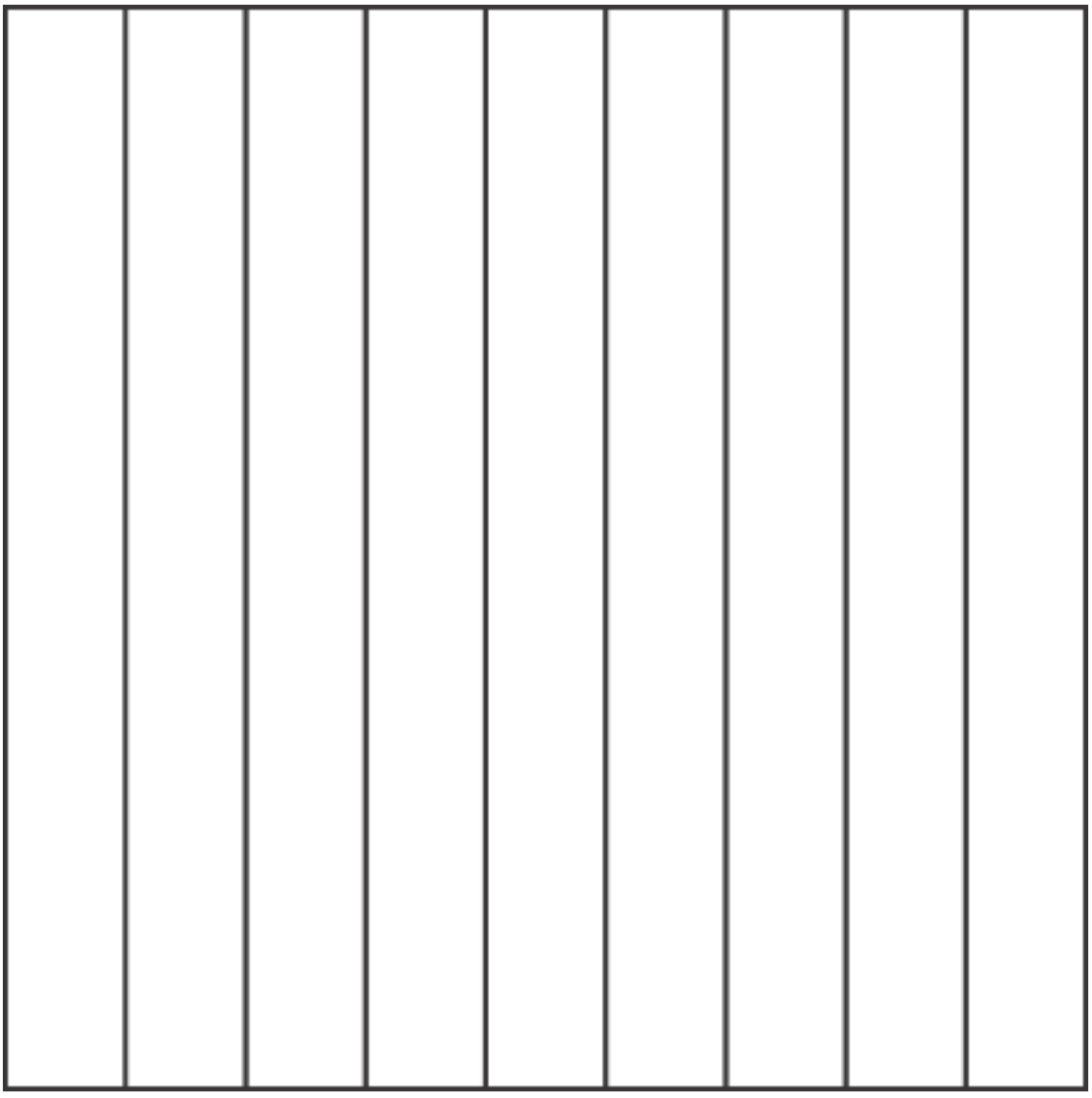
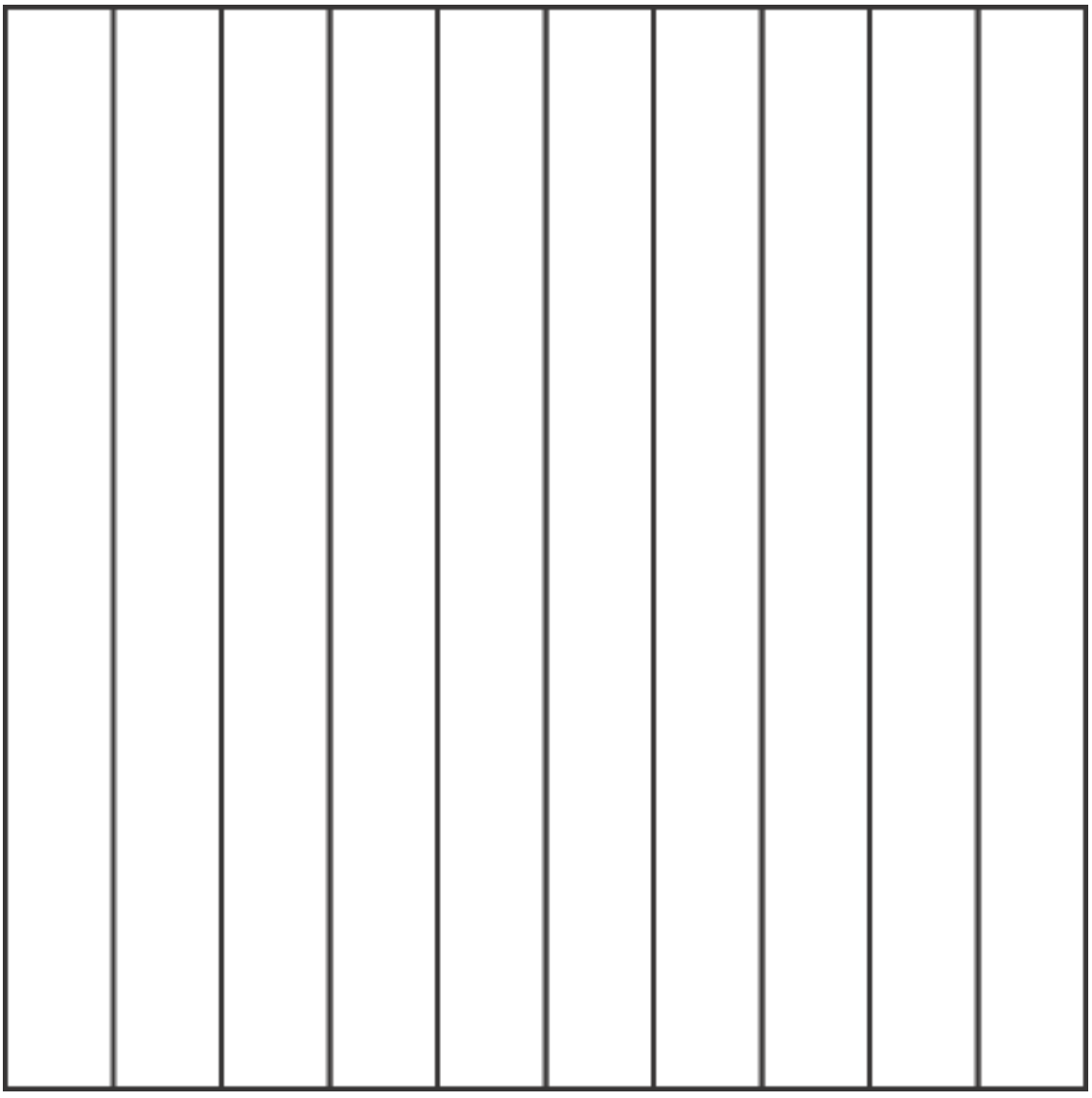


Fraction Square Template - Ninths



Fraction Square Template - Tenths



Multiplication Chart

X	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

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Teach History the Fun Way

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Being World Changers!

Raising World Changers!

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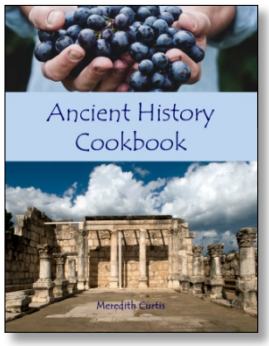
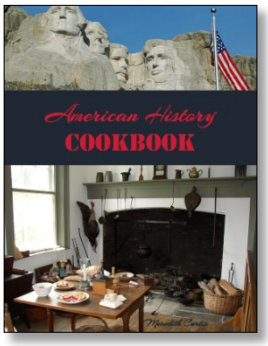
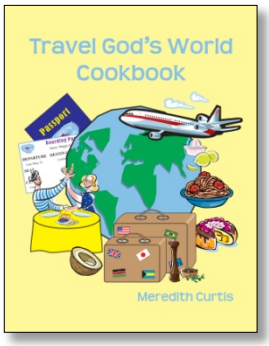
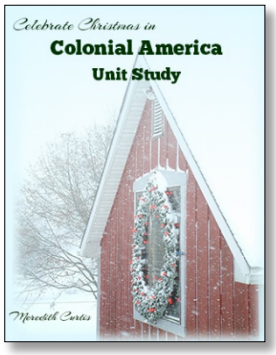
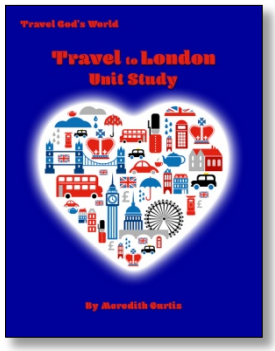
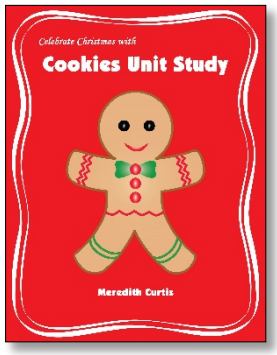


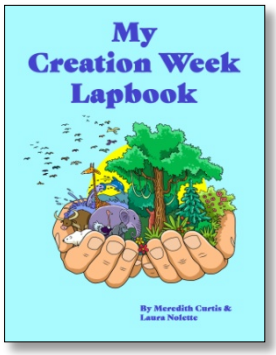


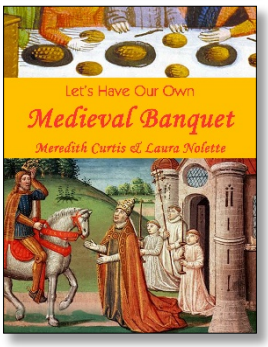


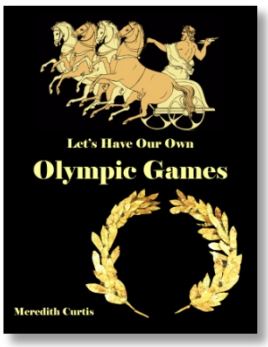


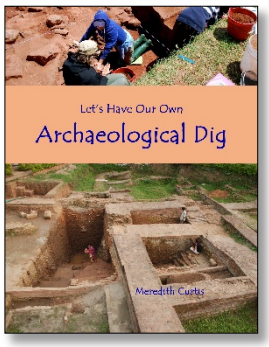


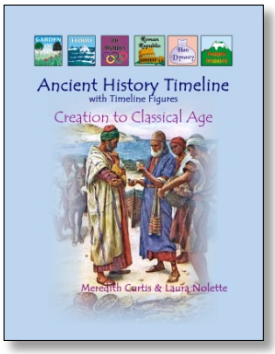


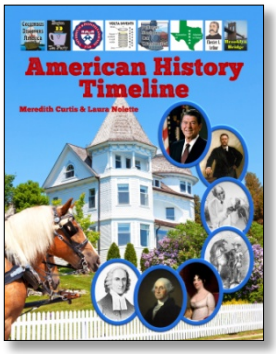


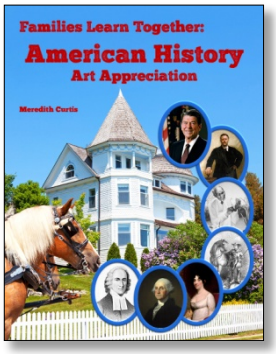


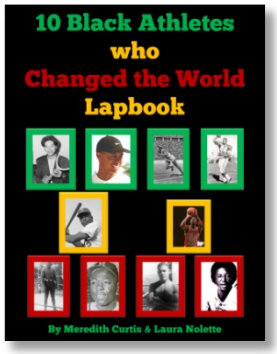




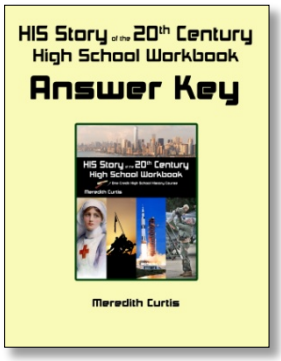


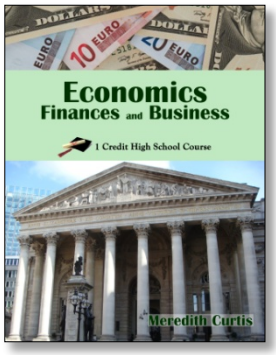


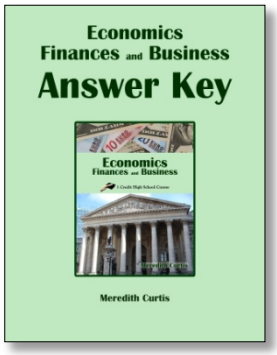


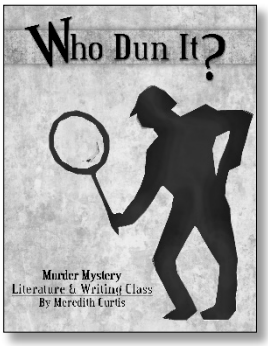


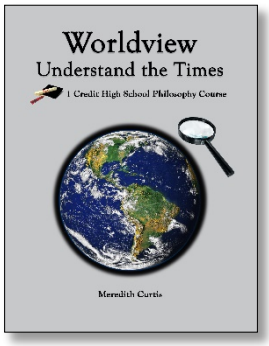
High School & Middle School

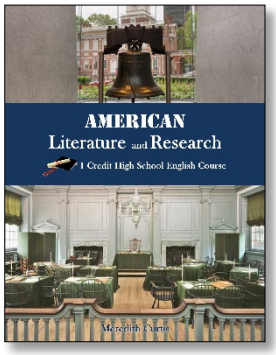


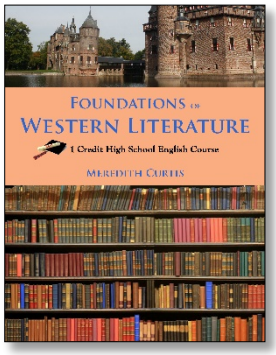


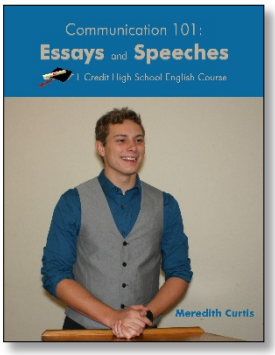


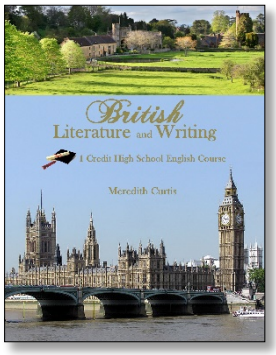




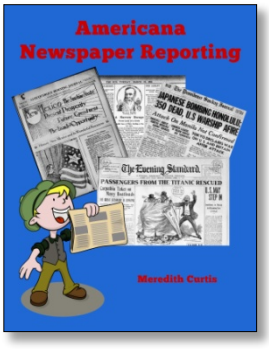


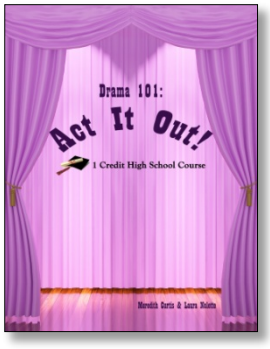


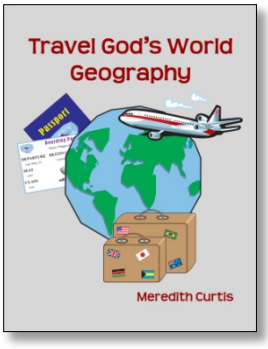


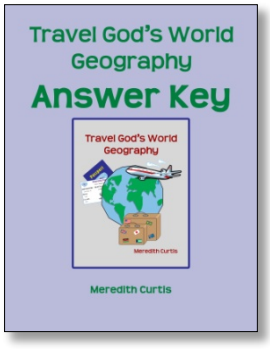


Middle School



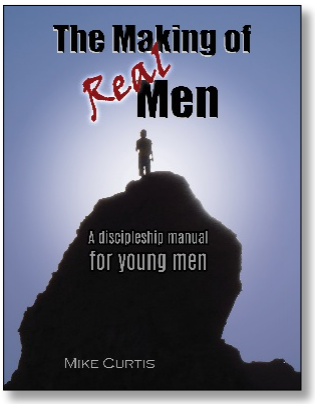


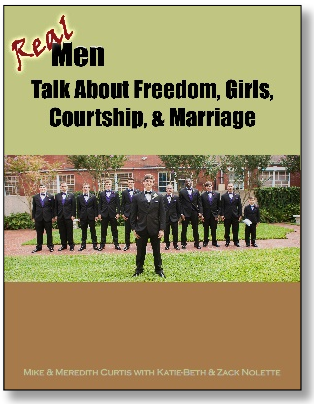




Real Men Discipleship Manuals

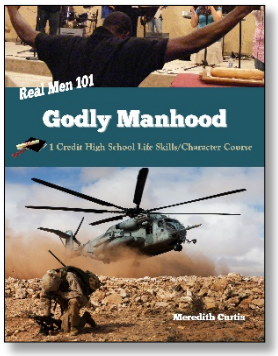
God calls fathers to impart life to their sons, passing the baton in the race of faith. These Bible studies were created for fathers (or mentors) to go through this material with their sons. Pastor Mike Curtis used these materials to mentor his own son and other young men in the church. These manuals cover tough issues that fathers and sons need to talk about and live out in their lives.

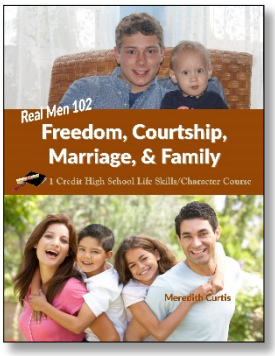




Real Men High School Bible/Life Skills

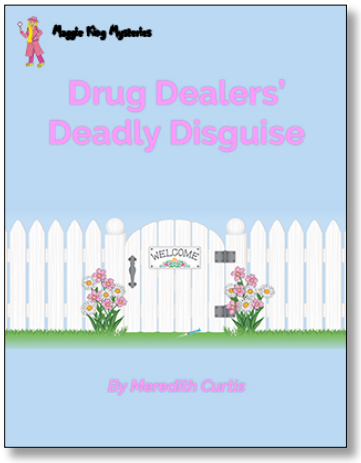
Do you want to prepare your sons to become godly husbands, fathers, church leaders, and pillars in their communities? These one-credit high school life skills classes build character and prepare young men for the future. Using living books, Scripture, and practical assignments, young men will learn to become the man God has called them to be.

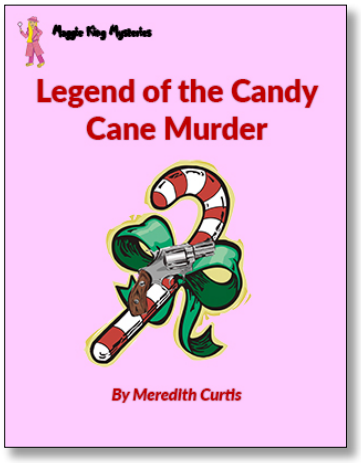


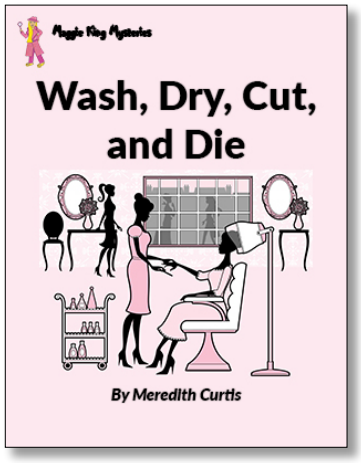


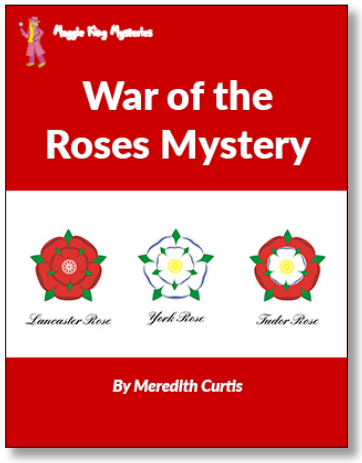
Maggie King Mysteries

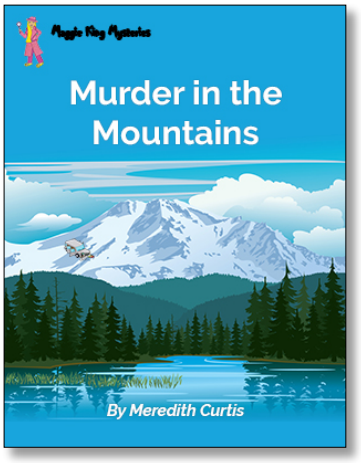
If you like cozy mysteries, you will love this series! Meet Maggie King, a pastor's wife and homeschool mom who keeps stumbling across dead bodies. With her sidekicks, Sophia and Mary-Kate and her curious children, Maggie is on one adventure after another.



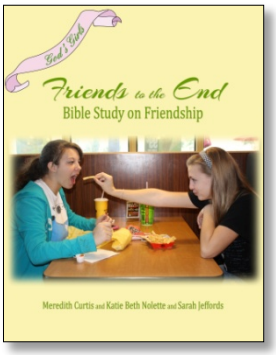


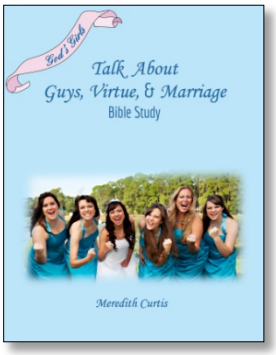




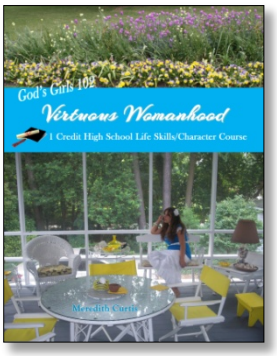


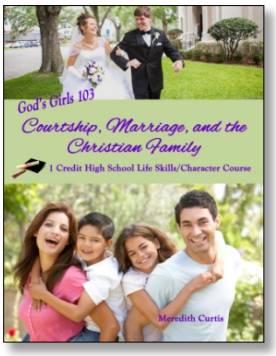
God's Girls Bible Studies

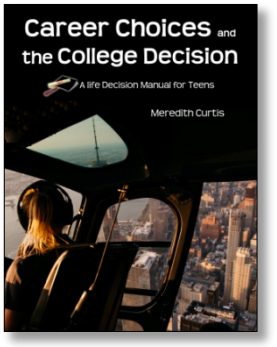




God's Girls High School Bible/Life Skill







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