



SUMMER

Math Guide

4TH GRADE

BUILD FLUENCY

Quick activities to try at home to build fluency skills from a foundation of conceptual understanding

ENGAGE IN PROBLEM SOLVING

Real world math examples to support problem solving skills

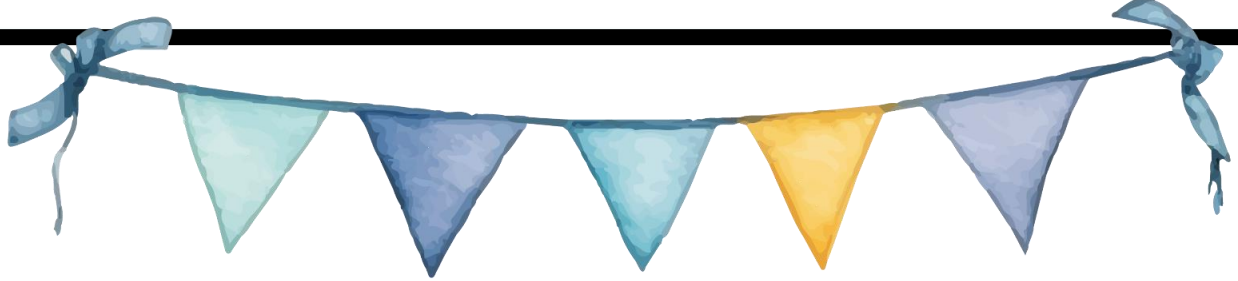
MAINTAIN SKILLS & PREVENT THE SUMMER SLIDE

Critical focus areas to prevent the summer slide and help children maintain their math skills

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Math Guide



This is the guide you've been waiting for!

Finally, a way to support your child with math over the summer without spending a fortune on materials, private tutoring or other resources.

The Math Coach Connection Summer Math Guide was designed to help caregivers support their children with the core content areas of math over the summer, with activities that integrate into your daily routine!

This guide includes information about grade-level math expectations from 4th Grade, as well as the upcoming content covered in 5th grade math. It includes a page for each core focus area for the grade level as well as a bonus fluency page, goal setting page and additional resource page (with links to helpful podcast episodes)! A total of 13 concise, high-impact pages! Each page has ways to integrate math practice into your daily routine over the summer. **The 4th Grade Summer Math Guide includes a page for each of the following categories:** Fluency Focus (addition and subtraction with large numbers), addition within 1,000,000, subtraction within 1,000,000, multiplication with large numbers, division with large numbers, fractions, decimals, measurement & data and geometry. **Every page includes:**

- Math Skills Activities: Easy, no-prep ways to help your child practice 4th grade math skills at home.
- Math Talk Moments: conversation starters to get your child talking about (and understanding) math
- Math Models: visual models of math concepts that 4th graders use for problem solving
- Math At Mealtime: ways to seamlessly integrate math into cooking, baking or prepping a meal. Since this is already a part of the daily routine, it is a natural place to integrate real-world, hands-on mathematics.
- Math 'Did You Know' Facts: important tips and information about 4th grade math skills
- Family Read Aloud & Game Ideas: a curated list of high-quality math books and games related to each focus area. These lists were designed specifically for fourth graders and their families.

Check out the following pages for more information on how to use the Summer Math Guide.

HOW TO USE

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Make Math Meaningful Over The Summer

This guide was created to make it easier for families to support their children with maintaining math skills over the summer. Practicing math skills over the summer is critical for preventing the summer slide. Integrating math practice into the daily routine, as well as spending some focused time on math practice will help set your child up for success as they start next school year. Time and resources are often a barrier to being able to practice math at home which is why the activities included in this guide are:

- **Integrated into everyday activities**, so they don't take much additional time and can often be done on the road, during mealtime or throughout the daily routine. This also helps children understand that math is part of the real world. These real-world examples make math more meaningful and build conceptual understanding.
- **Low cost**: The materials needed for all activities are materials you likely have around your home, or can be purchased at a low price, or borrowed. For example, playing cards, a dice, paper, pencil, various food items. *Most of the books included in the 'read aloud' section are available at local libraries.*
- **Low Prep, High Impact**: The conversation starters, activities, books and games listed in this guide are **high-interest** activities that will engage your child in meaningful math practice, while not taking much advanced time for you to prepare.

A Few Notes

- This guide is **not intended to replace summer school programs**. It is meant to supplement summer school and/or provide a guide for families to support children who are not in summer school math programs.
- This guide covers the **core content of Fourth Grade**. However, it does not cover all skills. It focuses heavily on fluency and operations with whole numbers as well as understanding of fractions and decimals.
- The activities in this guide are suggestions. You do not need to complete every activity and you can modify activities as needed to provide more support or make them more challenging.

Sample Schedule

Every child is different, and everyone's summer break is different. That's why the activities in this guide can be modified and the schedule can be adjusted to meet the needs of your child. You can also choose to focus more on just the areas in which your child needs the most support. You can shorten the schedule or extend it as needed. If it is helpful, use this sample schedule to plan your summer math practice.

Week 1

Multiplication
Integrate fluency practice

Week 2

Division
Spiral back to multiplication skills to support division

Week 3

Addition
Integrate fluency practice into this week

Week 4

Subtraction
Use addition to support subtraction

Week 5

Fractions
Focus on visual models to create equivalent fractions

Week 6

Decimals
Connect back to fractions from last week to build understanding

Week 7

Measurement & Data
Connect the area model to multiplication and division strategies

Week 8

Geometry
Pick a day to spiral back to multiplication and division fluency

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Quick Skills Check

- ❑ *In this section, you will see a brief checklist of skills related to the math concept listed at the top of the page. This does not cover all grade level skills but focuses on core skills to support understanding and fluency. This is helpful to check in with your child's current level of understanding.*

Math Talk Moments

Some conversation starters for engaging your child in math talk.

This section includes short conversation starters to engage your child in conversations about math. These are helpful for building mental math skills and thinking about math in the real world. The questions are designed to be modified as needed, or to be used more than once but with different numbers/topics.

Activities to Build MATH SKILLS

- ❑ *This section includes brief activities that you can do with your child to help them build understanding and fluency skills within the topic area. Some activities require materials, but most materials are ones that you can easily find at home (or can be borrowed or purchased at a low cost).*
- ❑ *Helpful materials to have on hand are*
 - ❑ *A dice*
 - ❑ *A deck of cards*
 - ❑ *Pencil and paper*
- ❑ *These activities are easily modified to provide more of a challenge or to provide more support. You can keep track of the activities you try on the checklist to hold your child accountable for math practice.*
- ❑ *These activities can be done independently, or one-on-one with a parent/teacher/supporter. They are family friendly and can be done with the whole family too.*

Math Models

This section will show visual models that are frequently used within the focus area. These are not all the grade level strategies that children learn, but provide a helpful visual so you know more about the strategies they might be using for problem solving.

Math at Mealtime

Mealtime is a perfect time to integrate math into the conversation. It also has many great examples of real-world math application. This section includes easy ways to integrate math skills into snack time, cooking, baking, planning and eating a meal.

Did You Know?

This section includes important information for families to know regarding the specific skills and strategies for the focus area. It shows how this grade-level math fits into the progression of K-5 math.

Family Read Aloud Books & Games

In this section you will find a list of books and/or games that support the skills needed for the mathematical focus area. These high-quality books and games integrate perfectly into family game night or read aloud time and help children apply their math skills to real-world situations and games.

GOAL SETTING

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Set Yourself Up For Success!

Use the space below to set some goals for the summer. Whether your goals are gaining new understanding of difficult math concepts, building fluency with your math facts, maintaining your math skills or anything in between, this goal setting sheet can help hold you accountable. Write down 3 goals you have for yourself this summer and then 3 things you can do to help you be successful. Set yourself up for success by trying your best!

My Summer MATH GOALS

1

2

3

Steps to SUCCESS

1

2

3



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HERE'S AN OVERVIEW OF WHAT 4TH GRADERS LEARNED IN MATH THIS YEAR

Operations & Algebraic Thinking ^{4th}

Interpret multiplication as a comparison

- Interpret a multiplication equation as a comparison
- Solve contextual problems involving multiplicative comparison
- Solve multi-step contextual problems with whole numbers using the four operations, including problems in which remainders must be interpreted
- Find all factor pairs for a whole number in the range of 1-100
- Generate a number or shape pattern that follows a given rule

Numbers & Operations in Base Ten ^{4th}

Fluently add and subtract within 1,000,000 and multiply and divide larger numbers

- Recognize that in a multi-digit whole number, a digit in one place represents 10 times as much as the digit to its right.
- Read and write whole numbers using standard, word and expanded forms
- Compare two multi-digit numbers based on the meaning of the digits in each place
- Round multi-digit whole numbers to any place
- Fluently add and subtract multi-digit whole numbers
- Multiply a whole number of up to 4-digits by a 1-digit whole number
- Multiply two 2-digit numbers
- Find whole-number quotients and remainders with up to 4-digit dividends and 1-digit divisors

Measurement & Data ^{4th}

Apply area/perimeter and lines/angles to the real world

- Solve two-step real-world problems involving whole number measurements with all four operations
- Know and apply the area and perimeter formulas to real world problems
- Make a line plot to display a set of measurement data (in fractions)
- Understand and measure angles using a protractor
- Recognize angle measure as additive and find unknown angle measurements

Numbers & Operations Fractions ^{4th}

Operations with fractions with unlike denominators and basic decimal understanding

- Compare two fractions with different numerators or different denominators by creating a common numerator or common denominator (or by comparing to a benchmark fraction)
- Understand a fraction as a sum of unit fractions
- Decompose a fraction into a sum of fractions with the same denominator
- Add and subtract mixed numbers with like denominators
- Solve contextual problems involving addition and subtraction of fractions
- Solve contextual problems involving multiplication of a whole number by a fraction
- Express fractions with the denominator 10 as an equivalent fraction with the denominator 100
- Read and write decimal notation for fractions with denominators 10 or 100. Locate these decimals on a number line
- Compare two decimals to hundredths

Geometry ^{4th}

Understand how lines create angles

- Draw points, lines, line segments, rays, angles (right, acute, obtuse, straight, reflex), perpendicular and parallel lines and identify these in 2-D figures
- Classify 2-D figures based on presence or absence of various angles or lines
- Recognize and draw lines of symmetry



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HERE'S WHERE 4TH GRADERS ARE HEADED NEXT YEAR IN 5TH GRADE MATH

Operations & Algebraic Thinking ^{5th}

Evaluate expressions and patterns

- Use parenthesis and/or brackets in numerical expressions and evaluate them using the order of operations
- Write simple expressions that record calculations with numbers and interpret them
- Generate numerical patterns using two given rules
- Form ordered pairs consisting of corresponding terms from numerical patterns and graph the ordered pairs on a coordinate plane

Numbers & Operations Fractions ^{5th}

Add, subtract, multiply and divide fractions

- Add and subtract fractions with unlike denominators (including mixed numbers)
- Solve contextual problems involving addition and subtraction of fractions
- Assess reasonableness of answers using benchmark fractions and number sense to estimate
- Multiply a fraction by a whole number or a fraction by a fraction
- Find the area of a rectangle with fractional side lengths
- Interpret multiplication as scaling (resizing)
- Divide unit fractions by whole numbers and whole numbers by unit fractions
- Solve real world problems involving multiplication and division of fractions

Geometry ^{5th}

Coordinate plane graphing

- Represent real-world problems by graphing ordered pairs on the first quadrant of the coordinate plane
- Classify 2-D figures in a hierarchy based on properties

Numbers & Operations in Base Ten ^{5th}

Fluently multiply and divide large numbers and understand operations with decimals

- Explain patterns in the number of zeros in a product when multiplying a number by powers of ten. *Use exponents to denote powers of 10.*
- Read and write decimals to thousandths using standard form, word form and expanded form
- Compare two decimals to thousandths
- Round decimals to nearest hundredth, tenth or whole number
- **Fluently multiply multi-digit whole numbers (up to 3-digit by 4-digit factors)**
- Find whole-number quotients and remainders of whole numbers with up to 4-digit dividends and 2-digit divisors. (Divide 4-digit numbers by 2-digit numbers) and explain calculations using models
- Add, subtract, multiply and divide decimals to hundredths using concrete models and strategies based on place value.

Measurement & Data ^{5th}

Convert measurements and measure volume

- Convert customary and metric measurement units within a single system
- Recognize volume as an attribute of solid figures
- Measure volume by counting unit cubes
- Relate volume to multiplication and addition
- Solve real-world problems involving volume of right rectangular prisms
- Know and apply the formula $V = l \times w \times h$ and $V = B \times h$
- Recognize volume as additive

FLUENCY FOCUS

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Quick Skills Check

- I can fluently add multi-digit whole numbers
- I can fluently subtract multi-digit whole numbers

What Does FLUENCY Mean

Being able to solve a problem both **quickly and accurately**. Children who are fluent in a particular skill, can think **flexibly** about how to solve the problem. Fluency **does not mean memorization**. Although fluency often leads to memorization of math facts or strategies.

Activities to Build FLUENCY

- Try solving a problem two ways. Use this to check your work to make sure your answer was the same both times. Decide which way was the most efficient/fastest.
- Play a fluency game: any game that requires you to solve a problem with accuracy, quickly. An example is 'Chance It Solve It': Roll four dice (or roll one dice 4 times), and the four numbers become the digits in a 4-digit number. Repeat this process to create another number. Then flip a coin. Heads means add the two numbers together, tails means subtract the smaller number from the larger number to find the difference. Solve the problem two ways and decide which was fastest, or race against a family member (or race against your own best time) to see who can solve it fastest (with accuracy).
- Practice solving a set of related problems mentally. *For example: $1,200 + 400$, then $1,200 + 40$ then $1,200 + 4$. Notice which place value changes each time.* Visualize how to solve the problem in your head to build mental math skills
- Model Math: Use a hands-on math manipulatives or draw a model to build deeper understanding of the value of an equation. Base ten block models work well for building understanding and fluency with regrouping/renaming in addition and subtraction.
- Share your thinking aloud by talking to a family member or teacher about your answer.

$$1,240 + 829$$

First Strategy:

Second Strategy:

Addition and subtraction fluency with large numbers is different from multiplication and division fluency in 3rd grade. The focus of fourth grade addition/subtraction fluency is for children to build a variety of 'tools in their toolkit' or strategies that they can use to quickly and accurately problem solve. Using fluency cards or flash cards is not as effective as having children solve a problem two ways and determine which strategy was faster/more accurate.

Did You Know?

Regrouping ('renaming' ten ones for one ten or ten tens for one hundred etc.) is often one of the most challenging parts of solving large addition problems. Making sure children build conceptual understanding of this idea using a hands-on model prior to using an algorithm is key.

Track Your Progress

*Continuing to practice **multiplication and division fluency within 100 (from 3rd grade)** is important for problem solving with larger numbers. You can continue to practice those smaller multiplication/division facts and keep track of your progress with a 'facts I know' and 'facts I'm working on' chart.*

MULTIPLICATION

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Quick Skills Check

- I can multiply to solve contextual problems involving multiplicative comparison
- I can find all factor pairs for a whole number (up to 100)
- I can multiply a whole number of up to 4-digits by a 1-digit number
- I can multiply two 2-digit whole numbers

Math Talk Moments

Some conversation starters for engaging your child in math talk.

- If I want to plant 48 carrot seeds in rows with the same number of seeds in each row, what are some possible combinations of rows and number of seeds per row I could plant?
- I want to buy more blueberries (or choose other food item) this week than I did last week. Should I buy three times as many? Four times as many? Explain
- Look at that tall (building, giraffe at the zoo, tree etc.). How many times as tall as you do you think it is?

Activities to Build MULTIPLICATION SKILLS

- Practice multiplying a number by multiples of 10 or 100 mentally (this is a great activity to do in the car or on the go). Ex: What is 9×10 , 9×40 , 9×600 etc. This supports the skills needed to break apart larger problems.
- Incorporate math into mealtime. Find examples of multiplication problems while cooking, baking or serving a meal.
- Play 'Over Under': Using a deck of cards (remove face cards), draw 3 cards. This number is the target number. Then players draw four cards, and use those cards to either make two 2-digit numbers, or a 3-digit number and a 1-digit number that will become the factors. Before multiplying, estimate if the product will be 'Over or Under' (more than or less than) the target number. Record your estimation. All players find the product of their two factors and get a point if they were correct on their estimation.
- When problem solving, encourage your child to solve a problem in two ways. One way with a visual model and one way without to check their work and prove their thinking.
- Multiplication in the real world: look for examples of multiplication in the real world, specifically multiplicative compare. For example: *signs that say Save 2x as much, or double your earnings!*
- Play games with fact fluency cards to maintain multiplication fluency of smaller problems

Multiplication Models 16×45

Array/Area (Partial Products)

	40	5	
10	$10 \times 40 = 400$	$10 \times 5 = 50$	$400 + 240 + 50 + 30 = 720$
6	$6 \times 40 = 240$	$6 \times 5 = 30$	

“Standard Algorithm”

2	16	
3	45	
	+ 80	
	+ 640	
	720	

Distributive Property

$(10 \times 45) + (6 \times 45)$

$450 + 270$

720

Math at Mealtime

- Look at the ingredient labels on a cereal/cracker box. Calculate the total number of calories for the entire box (based on calories per serving and total servings per box)
- Choose a small food like Cheerios, blueberries, goldfish crackers etc. for snack. Give yourself a set number (ex: 8). Then give your child 2 times as many, or 3 times as many. Using the vocabulary 'times as many.' If more people are at the table, give each person twice as many as the person before them.

Did You Know?

Fourth graders need to understand the real-world context of multiplicative comparison. Using a bar model is helpful for solving challenging word problems.

Dogs

18

Cats

18	18	18
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Ex: there were 3 times as many cats as dogs at the shelter

Family Read Aloud Books & Games

- **Multiplying Menace: The Revenge of Rumpelstiltskin** by Pam Calvert
- **Sir Cumference and All the Kings Tens** by Cindy Neuschwander
- **One Grain of Rice: A Mathematical Folktale** by Demi
- **'Holiday in July!' Snowball Fight** Write multiplication expressions on separate pieces of paper. Crumple it up and throw to the middle of the room. Set a time for everyone to go grab a new snowball and solve the problem.
- **Prime Climb** A family board game that focuses on factor pairs

DIVISION

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Quick Skills Check

- I can divide to solve contextual problems involving multiplicative comparison
- I can find all factor pairs for a whole number (up to 100)
- I can divide 4-digit numbers by 1-digit numbers
- I can interpret the remainder in a division problem

Math Talk Moments

Some conversation starters for engaging your child in math talk.

- What is your favorite strategy to use for division? Why?
- If today I spent half as much time doing laundry as I did yesterday. If I spent _____ minutes yesterday, how much time did I spend today? *Repeat this with various other tasks and amounts of time and multipliers (Ex: 1/3 as much time, or yesterday I spent twice as much time as today).*
- Look at that tree. About how many leaves do you think are on the tree? Imagine there were the same number of leaves per branch, about how many leaves would there be per branch?

Activities to Build DIVISION SKILLS

- Set an activity goal. Set a goal for total number of steps for the week (or month) or minutes of total activity. Divide it by 7 (or weeks/days in the month) to figure out how many steps per day (or minutes per day) you would have to walk to reach your goal. *If you don't have a step counter, you can set a weekly mileage goal for running, biking, walking, swimming. Ask questions such as 'if we did half as many this week as we do next week, or three times as many tomorrow as I did today' etc.*
- Incorporate math into mealtime. Find examples of division problems while cooking, baking or serving a meal.
- Play 'Cash Out': Each player draws 4 cards from a deck (no face cards) and puts them in order so that they make the largest number possible. This is your starting amount of 'money.' Then they take turns drawing one card. That card becomes your divisor. Divide your starting amount of money by your divisor and record your answer. If there is a remainder, round to the nearest whole number to continue playing. Players draw new divisor cards on their turn and continue dividing. The person who 'cashes out' and gets closest to zero first, wins.
- Use hands-on manipulatives (counters such as Cheerios, blueberries, cubes etc.) whenever possible for modeling division.
- Work backwards: start with a division equation and talk through different real-world scenarios/story problems that would be a realistic context for the problem.
- Practice fact families: write the division equation that is related to a familiar multiplication equation to maintain fluency of smaller facts. Ex: $7 \times 8 = 56$ so $56 \div 8 = 7$

Division Models

Partial Quotients

$$\begin{array}{r}
 6 \overline{) 1,248} \\
 \underline{1,200} \\
 48 \\
 \underline{48} \\
 0
 \end{array}$$

$6 \times 200 = 1,200$
 $6 \times 8 = 48$
 $200 + 8 = 208$

$$1,248 \div 6$$

Long Division

$$\begin{array}{r}
 208 \\
 6 \overline{) 1,248} \\
 \underline{12} \\
 48 \\
 \underline{48} \\
 0
 \end{array}$$

Math at Mealtime

- Compare grams of sugar in a very sugary cereal, to a less sugary cereal (or compare two other foods with contrasting ingredients). Figure out 'how many times as much sugar' is in one food than the other by dividing one number by the other.
- Take the number of calories per serving on a nutrition label and divide it by the number of people in your family to figure out if you all shared one serving, how many calories each person would get.

Did You Know?

There are many ways to interpret a remainder and the context of the problem determines how the remainder should be used. For the problem $29 \div 4$, depending on the context the answer might be:

- 7 Remainder 1
- Round up to 8
- Just 7
- Just 1

Family Read Aloud Books & Games

- **Divide and Ride** by Stuart J. Murphy
- **The Lion's Share** by Matthew McElligott
- **The Multiplying Menace Divides** by Pam Calvert
- **A Remainder of One** by Elinor Pinczes
- **Numi by Niche Nation Games**
- **Proof!** A family game to practice mental math
- **Missing Factor Division Dash** Available in my [TPT Store](#)

ADDITION

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Quick Skills Check

- I can round multi-digit whole numbers to any place
- I can fluently add multi-digit whole numbers (within 1,000,000)
- I can compare two multi-digit whole numbers
- I can read and write multi-digit whole numbers using standard form, word form and expanded form

Math Talk Moments

Some conversation starters for engaging your child in math talk.

- If we drove 5 miles today (which is about 26,400 feet—there are 5,280 feet per mile), and we drive the same distance tomorrow, about how many total feet will we drive? *Modify this by changing the distance, by having your child convert the measurement etc.*
- About how many people do you think are at the fair/festival? (Or look up the attendance of a baseball game or concert). If the same number of people come tomorrow, how many total people will be in attendance?

Activities to Build ADDITION SKILLS

- Make a place value chart to keep track of the hundreds, tens and ones while adding. You can also use grid or graph paper to keep your work organized.
- Incorporate math into mealtime. Find examples of addition problems while cooking, baking or serving a meal.
- Play 'Largest Sum': Make a place value chart on a piece of paper with Ten Thousands, all the way down to ones. Players will each create two 5-digit numbers. Roll a dice 5 times. Each time the dice is rolled, decide which place value digit that number will represent. The goal is to try to make the largest number, but once you write a number in a place value spot, you cannot change it. *So for example, if you roll a 1, you might want to put that in your ones or tens place, vs. if you roll a 6 you will want to put that in your ten-thousands place.* Repeat this process so you have two 5-digit numbers. Then add the numbers together. The player with the largest sum wins the round.
- Weekly mileage or minutes (either for running, walking, biking, swimming, or driving). Keep track of the number of miles in either feet (5,280 feet per mile) or yards (1,720 yards per mile) or seconds (60 seconds per minute) each day. Add together your total mileage for the week.

Addition Models

Place Value Addition/ Standard Algorithm	28,242 + 9,370	Break Apart One Addend
$\begin{array}{r} 1 \\ 28,242 \\ + 9,370 \\ \hline 37,612 \end{array}$		$\begin{aligned} 28,242 + 9,000 &= 37,242 \\ 37,242 + 300 &= 37,542 \\ 37,542 + 70 &= 37,612 \end{aligned}$

Note: children can return to using base-ten blocks that they used to build conceptual understanding of addition in previous grades at any time to check their work/build understanding

Math at Mealtime

- Look at the mg of sodium on the nutrition labels of foods you eat. Keep track of the total amount of sodium you eat throughout the week (not for dietary reasons but as a real-world math example). Add it all together at the end of the week. *You can compare a different ingredient, or just use repeated addition to find the total amount of sodium in a box of crackers.*
- Make a s'mores math snack! Graham crackers for hundreds, chocolate pieces for tens and marshmallows for ones. Make a 3-digit number using the model. Then write the number in expanded form or practice rounding to the nearest ten and hundred.

Did You Know?

Organization is one of the key factors to success in solving multi-digit addition problems. If a child uses sloppy handwriting or doesn't line up the numbers in the correct place value, they might make an error. Using a place value chart or solving problems on grid/graph paper is helpful.

Family Read Aloud Books & Games

- **Billions of Bricks** by Kurt Cyrus *Estimate the bricks on each page*
- **A Million Dots** by Andrew Clements
- **Shut the Box** Board Game
- **Monopoly Junior** *Keep track of total amount of money on a separate sheet of paper*
- **Proof!** *A family card game to build mental math skills*

SUBTRACTION

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Quick Skills Check

- I can round multi-digit whole numbers to any place
- I can fluently subtract multi-digit whole numbers (within 1,000,000)
- I can compare two multi-digit whole numbers
- I can read and write multi-digit whole numbers using standard form, word form and expanded form

Math Talk Moments

Some conversation starters for engaging your child in math talk.

- Which problem would be more challenging for you to solve. $9999-1,524$ or $10,000-1,524$. Why? *You can repeat this with other numbers that require regrouping or no regrouping.* What tools can you use to help you solve that problem?
- How can you use addition to help you solve a challenging subtraction problem?
- About how many inches taller do you think that tree is than that flower (or compare two buildings or other landmark or compare two animal height)

Activities to Build SUBTRACTION SKILLS

- Make a place value chart to keep track of the hundreds, tens and ones while subtracting. You can also use grid or graph paper to keep your work organized.
- Incorporate math into mealtime. Find examples of subtraction problems while cooking, baking or serving a meal.
- Play 'Zero Race': All players start at 1,000,000. Each player rolls 4 dice (or one dice 4 times), to create the largest 4-digit number they can. The player subtracts that number from 1,000,000. This process continues, subtracting each number from the remaining difference and keeping track of each player's new number as you race to zero. The first person to get closest to zero wins. As you get closer to zero, you can switch to using 3 dice for a 3-digit number, or just one or two dice to try to get exactly to zero.
- Practice 'renaming' or 'regrouping.' Take a large problem like $10,000 - 8,946$ and have your child model it with a base ten quick picture. Model what it looks like to rename 10 as ten ones, or 100 as 10 tens to check their work as they solve the problem.
- Play 'Add Up or Subtract Back': Choose two subtraction problems for your child to solve, and make sure that one problem has two numbers close together. For example: $10,000 - 9,948$, and $10,000 - 6,452$. Choose which problem makes more sense to 'add up' from the lower number to the higher number. Try solving both problems both ways to see which is more efficient.

Subtraction Models

Place Value Addition/ Standard Algorithm $\begin{array}{r} \overset{2}{3} \overset{12}{2}, \overset{6}{6} \overset{14}{7} 4 \\ - \quad \quad 6,865 \\ \hline 26,009 \end{array}$	Subtract in Parts $32,874 - 6,000 = 26,874$ $26,874 - 800 = 26,074$ $26,074 - 60 = 26,014$ $26,014 - 5 = 26,009$
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Math at Mealtime

- Set a grocery budget for the month and try to stick to it while shopping. Every time you spend money, work together to subtract that from the budget. *Round to the nearest whole dollar.*
- Play 'What's The Difference' and look at 2 or 3 different brands of the same food (at the grocery store and at home) and calculate the difference between the amount of sodium, calories, protein, total fat etc. *Bonus: use multiplication to compare the amount in the entire can/box, rather than just the amount per serving.*

Did You Know?

Addition and subtraction are inverse operations, so addition is helpful for supporting subtraction problem solving. Especially if the two numbers in a subtraction problem are close together, they can 'add up' rather than 'subtract back,' This is also a helpful tool for checking their work for accuracy.

Family Read Aloud Books & Games

- **Shark Swimathon** by Stuart J. Murphy
- **Numbed!** by David Lubar
- **Proof!** *A family card game to build mental math skills*
- **Adsumundi:** *A family game to practice fluency with all 4 operations*

FRACTIONS

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Quick Skills Check

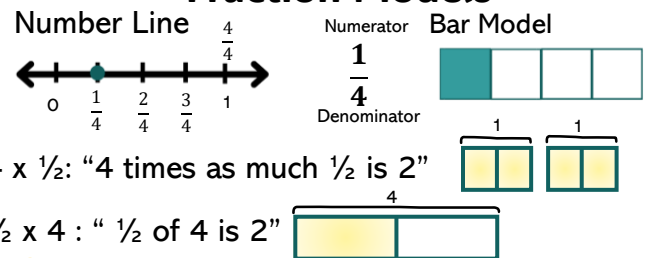
- I can compare two fractions with different numerators or different denominators by creating a common numerator or common denominator (or by comparing to a benchmark fraction)
- I can decompose a fraction into a sum of fractions with the same denominator
- I can add and subtract mixed numbers with like denominators
- I can solve contextual problems involving addition and subtraction of fractions
- I can solve contextual problems involving multiplication of a whole number by a fraction

Math Talk Moments

Some conversation starters for engaging your child in math talk.

- What tools do you use to help you understand fractions?
- Choose two fractions to compare (even better if you can find an example in the real world). For example: $\frac{1}{3}$ and $\frac{3}{4}$ or $\frac{3}{6}$ and $\frac{5}{8}$. Which fraction is bigger? Prove your answer by drawing a picture or making a model. *Encourage comparing to a benchmark fraction like $\frac{1}{2}$.*
- If I ate $\frac{1}{4}$ of a pizza and you ate $\frac{3}{6}$ of the same pizza, how much pizza did we eat? What fraction of the pizza is left? How do you know?? (Repeat this with other fractions or other foods or distances, like run $\frac{1}{2}$ mile or $\frac{1}{8}$ mile).

Fraction Models



Math at Mealtime

- Find a recipe in a cookbook or online that you want to make together. Look for fractional amounts of various ingredients in the recipe. Discuss what the fractions mean, and compare them (ex: $\frac{1}{2}$ cup flour and $\frac{2}{3}$ cup sugar. Is there more flour or more sugar?)
- Find a food (cake, pizza, pie, donut, chocolate bar, celery stalk) to cut into equal pieces, what fraction represents one of the pieces? You can also do this with cutting something to equally share with everyone in the family, or everyone at the table. Try comparing two fractions with different denominators.

Did You Know?

Visual models are very important for building fraction understanding at the fourth-grade level. Using a visual model to find a common denominator and generate equivalent fractions helps build important conceptual understanding, so hands-on and visual models are encouraged.

Family Read Aloud Books & Games

- **The Lion's Share** by Matthew McElligott
- **Fractions in Disguise: A Math Adventure** by Edward Einhorn
- **Sir Cumference and the Fracton Faire** by Cindy Neuschwander
- **Bigfoot Finds Fractions!** By Therese M. Shea
- **Fraction Formula Game** By Educational Insights
- **Fraction Dominoes** By Junior Learning

Activities to Build FRACTION UNDERSTANDING

- Find something to measure (a table, a chair, a wall, a pencil etc.). Measure the item using a ruler/measuring tape and look for the fractional measurements on the ruler.
- Incorporate math into mealtime. Find examples of fractions while cooking, baking or serving a meal.
- Play 'Fraction Compare'. Players take turns rolling two dice (or one dice twice). The number first number rolled becomes the denominator and the second number is the numerator. Ex: if you roll a 4 and then a 2, the fraction is $\frac{2}{4}$. Then the next player(s) roll a fraction. After all players have a fraction, put the fractions in order from greatest to least. The person with the largest fraction gets a point. *For more challenge, you can use a deck of cards for larger numbers (face cards are 12). Another challenge is to put fractions into simplest form or add all the fractions rolled together.* Players should draw a picture/visual model to represent their fraction (or draws their fraction on a number line to prove it is the largest).
- Use hands-on manipulatives (fraction tiles, folded paper strips, a chocolate bar, fraction stackers etc.) whenever possible for modeling fraction problem solving.
- Fractions: look for examples of fractions in the real world. Ex: a chocolate bar broken into equal sized pieces, ingredients in a recipe, equal sized slices of pizza, fractions on a sign at a gas station, sale signs at stores etc.

DECIMALS

4TH GRADE

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Quick Skills Check

- I can read and write decimal notation for fractions with denominators 10 or 100.
- I can locate these decimals on a number line
- I can compare two decimals to hundredths

Math Talk Moments

Some conversation starters for engaging your child in math talk.

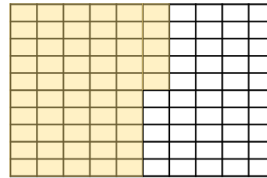
- Where have you seen decimals in the real world? How are decimals helpful in our daily lives? *Examples: spending and calculating money, accurate measurements, batting averages, percentages etc.*
- Would you rather have 8 tenths of a dollar or 80 hundredths? Why? *Compare this to 8 dimes or 80 pennies and recognize that these are the same value. Try this with other examples too.*
- What is the difference between 6 hundreds and 6 hundredths? Which one is bigger? Which one is smaller?

Activities to Build DECIMAL UNDERSTANDING

- Empty out your child's piggy bank (or have them start one). Sort the quarters, dimes, nickels and pennies. Calculate the total value of each category by writing a decimal. Then have them write the total using decimal notation. *You can also do this after having a lemonade stand or rummage sale. Have them keep track of their money over the summer.*
- Incorporate math into mealtime. Find examples of decimals while cooking, baking or serving a meal.
- Play 'Decimal Compare': Make a place value chart with **ones, tenths, and hundredths**. Make sure to separate the ones and the tenths with a decimal point. Roll two dice (or one dice two times, or draw two cards from a deck with no face cards). Use these two numbers to create the largest decimal number possible. In the hundredths and tenths place. The next player does the same thing to make their number. Then compare the two numbers. The player with the larger number gets a point. *You can also play by trying to make the smallest number possible, or can use three numbers for ones, tenths and hundredths.*
- Relate decimals to money whenever possible to build conceptual understanding of hundredths (pennies) being smaller than tenths (dimes).
- Use a place value chart every time you write or compare decimals to emphasize decimal placement and value.
- Start only using the language 'and' when referring to a decimal. For example: 345 is just 'three hundred forty-five' (not three hundred **and** forty-five). But the number 3.45 is 'three and forty-five hundredths.'

Fraction/Decimal Models

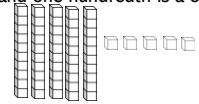
Hundreds Chart Model



0.45

Base Ten Model

This model is similar to the traditional base ten model, but one whole is the hundred flat, one tenth is a tens rod and one hundredth is a ones cube.



Math at Mealtime

- Next time you go out to eat, or go grocery shopping, notice the decimal numbers in prices. Play a little game of 'price compare' to have your child determine which item is the 'better buy' (or lower price) by comparing the decimal numbers to the hundredths.
- Grab a scale and weigh various foods. For example: compare the weight of a pear to the weight of a watermelon, or the weight of a block of cheese to the weight of a pint of milk etc. Notice the decimals to the tenth of a pound and compare or put in order from heaviest to lightest.

Did You Know?

Fourth graders are expected to build a foundation of decimal understanding that they can build upon in fifth grade when they start operations with decimals. Using visual models to build conceptual understanding is very important at this level.

Family Read Aloud Books & Games

- **Lift the Flap Fractions and Decimals** by Usborne
- **Place Value** by David A. Adler
- **Bank It!** A family board game that focuses on using money and decimal numbers
- **Money Bags: A Crazy Coin Counting Game** Record each amount by writing it with decimal notation

MEASUREMENT & DATA

4TH GRADE

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Quick Skills Check

- I can solve two-step real-world problems involving whole number measurements with all four operations
- I can apply the area and perimeter formulas to real world problems
- I can make a line plot to display a set of measurement data (in fractions)

Math Talk Moments

Some conversation starters for engaging your child in math talk.

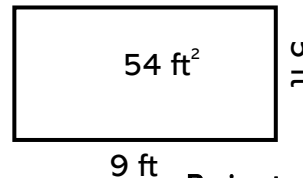
- If I wanted to find the area of a football field, what measurements would I need? How would I calculate area? What measurement unit should I use? How would that be different from the measurement units I would use to find the area of this room?
- Why would someone want to find the perimeter of something (ex: bulletin board, room, backyard, notebook). *Some reasons might include, to decorate, to add a border, to put tile on etc.*
- Would you rather design and measure a fence for a rectangular yard, or design and measure the wallpaper for a wall? Why?

Activities to Build MEASUREMENT SKILLS

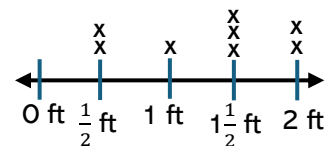
- Choose a room in your home and draw a scale model. Measure the dimensions of the room using a ruler, measuring tape or yard/meter stick. Then draw a scale model. Find the area and perimeter of the actual room and of the scale model drawing. Extension: Use this to design a room remodel, or to plan for wallpaper on a wall. *Try converting the measurements from feet to inches or from centimeters to millimeters.*
- Incorporate math into mealtime. Find examples of area problems while cooking, baking or in the kitchen.
- Play 'Room Remodel': Find a deck of cards and a piece of paper (preferably grid/graph paper) and a pencil. On a player's turn, draw two cards from the deck (give face cards a value of 12 in this game and Aces a value of 11.). Add the value of the two cards together and that is the first dimension of your starting room. Then draw two more cards to add together to make the second dimension of the room. For example, 3 and 9 is 12 and 6 and 8 is 14, so the room is 12 x 14. Players then calculate the area and perimeter of their 'room' and record it on a piece of paper (*use generic 'units' for the unit of measure*). Next, players each draw one card. Either add the value of the card to one of your dimensions or subtract it from one of your dimensions. Draft a new room with this new dimension. Record the new area and perimeter. Notice how the area and perimeter of the room changes throughout the game. There is no official end of the game, but one you stop, take the room design each player ended with and draw a design of what you would put in the room.
- Measure the length of 5-10 objects around the house using a ruler or measuring tape. Make a line plot of the measurement data (include fractions to the nearest fourth of an inch).

Area/Graph Models

Area = length x width



Line Plot



Perimeter: add all side lengths together

Math at Mealtime

- Many snacks/cereals come in boxes. Find a measuring tool such as a ruler and discuss the measurable attributes of the box. Then focus on linear measurements: *Length, width, height*. Calculate the area and perimeter of one of the sides of the box.
- Measure and calculate the area and perimeter of your kitchen or dining room table. *Think about why this would be important in a real-world context: for example, buying a tablecloth.*
- Find a rectangular food like a graham cracker. Discuss the units of measure you could use to find the area and perimeter.

Did You Know?

Calculating area connects directly to the multiplication strategies that fourth graders use to solve larger problems (partial products). When solving area problems it is helpful for children to break apart one or both factors to solve the problem just like they do with the distributive property or partial products strategies.

Family Read Aloud Books & Games

- **Perimeter Area and Volume: A Monster Book of Dimensions** by David A. Adler
- **The Loch Ness Monster Loves to Measure** by Therese M. Shea
- **Fence It In Exploring Area and Perimeter Game** by Learning Advantage

GEOMETRY

4TH
GRADE

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Quick Skills Check

- I can measure angles using a protractor
- I can find unknown angle measurements
- I can draw points, lines, line segments, rays, angles (right, acute, obtuse, straight, reflex), perpendicular and parallel lines and identify these in 2-D figures
- I can classify 2-D figures based on presence or absence of various angles or lines
- I can recognize and draw lines of symmetry

Math Talk Moments

Some conversation starters for engaging your child in math talk.

- Look at the walls in your home, or picture frames on the walls, or windows etc. Where do you see examples of perpendicular and parallel lines? What angle do you see? Is this angle greater than or less than a 90-degree right angle? How do you know?
- What tools can you use to measure angles? What if you don't have a protractor? How could you measure an angle? *Example: compare it to the corner of a piece of paper 90-degree angle*
- While driving or traveling, look for and talk about examples of various types of angles. Or for a movement break at a rest stop, make various angles using your arms/body.

Activities to Build GEOMETRY UNDERSTANDING

- Go on an 'Angle Hunt' in your yard, your home, a local park, a museum, a grocery store. Make a checklist of acute, obtuse and right angles, as well as parallel and perpendicular lines. Keep track of how many times you see each type of angle.
- Incorporate math into mealtime. Find examples of geometry problems while cooking, baking or serving a meal.
- Play 'Shape Sort': Draw a variety of different shapes on small pieces of paper or post-its. These can range from polygons (closed figured with at least three-line segments and angles for example: triangles, quadrilaterals (square, rectangle rhombus, trapezoid etc.) pentagons, hexagons, octagons etc.) to other figures. Choose an attribute to sort the shapes by and sort them into two (or more categories). For example: presence of parallel lines and absence of parallel lines. Or shapes with obtuse angles and shapes without obtuse angles. Or shapes with at least 2 lines of symmetry and shapes without at least 2 lines of symmetry. Play as many times as you want with various different categories.
- Spend time drawing together. Draw a self portrait and then draw a line down the middle and discuss how not everyone's face has a line of symmetry. Look for things that are similar and different on each side of your face by looking in a mirror.
 - Or play a game where you go back and forth adding a line, point, ray, angle or set of lines to a drawing to create an abstract piece of artwork together.
 - Or draw symmetrical shapes for each other and let the other person find as many lines of symmetry as they can in each shape.

Geometry Models

Parallel Lines



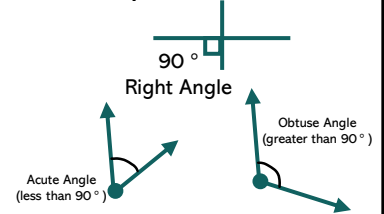
Ray



Line Segment



Perpendicular Lines



Math at Mealtime

- Use a paper plate for snack to represent a 360-degree angle. Then draw a point on the middle of the plate, with two rays coming off the point. Use a protractor to measure the angle that was made. Or place a piece of tape in the middle with two pieces of yarn coming off the center, and measure the various angles you create.
- Food shapes: Eat a snack or meal with a variety of food shapes (ex: square bread, circular apple slice, rectangular graham cracker etc.) Discuss the shapes and how you could categorize them by attribute based on angle measure and type of lines.

Did You Know?

Fourth grade is the only elementary year that officially covers angle measurement in the standards. This means that fourth grade is a critical year for building understanding of problem solving with measuring angles. In fifth grade and beyond, is assumed that children understand basic angle measure since the concept is not revisited until in a more complex context.

Family Read Aloud Books & Games

- **Seeing Symmetry** by Loreen Leedy
- **Which One Doesn't Belong** by Christopher Danielson
- **The Uzzle** a family game to build visual learning skills and notice symmetry
- **Drop It** A family game (look for lines and angles in each shape)
- **Geostix Deluxe Set** practice building and measuring angles

ADDITIONAL RESOURCES

4TH GRADE

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The Dog

Ate My

Homework

PODCAST GUIDE

The Dog Ate My Homework Podcast was designed to empower caregivers to support their children with math at home. It includes grade-level specific math information, tips, games and ideas to try! Check out these helpful episodes!

- Episode 1: *Supporting Your Child's Growth Mindset in Math*
- Episode 2: *Homework Routines: Setting Your Child Up For Success on Math Homework*
- Episode 4: *What is this 'New Math' Anyway?*
- Episode 6: *Quick Homework Troubleshooting Tips*
- Episode 15: *Multiplication Part 1: How Third (And Fourth) Graders Build Multiplication Understanding*
- Episode 18: *Fourth Grade Multiplication Part 1: The Major Shifts from Third to Fourth Grade*
- Episode 19: *Fourth Grade Multiplication Part 2: The Strategies and At Home Tips*
- Episode 20: *Fourth Grade Division: Supporting Your Child as They Solve Challenging Problems*

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