# Fourth Grade Math
## Overview
### 2019 - 2020

This document is designed to provide parents/guardians/community an overview of the curriculum taught in the FBISD classroom. Included, is an overview of the Mathematics Instructional Model and Pacing, TEKS, Unit Overview, Big Ideas, Essential Questions, and Concepts for each unit.

### Definitions:

**Overview** – The content in this document provides an overview of the pacing and concepts covered in a subject for the year.

**TEKS** – Texas Essential Knowledge and Skills (TEKS) are the state standards for what students should know and be able to do.

**Process Standards** – The process standards describe ways in which students are expected to engage in the content. The process standards weave the other knowledge and skills together so that students may be successful problem solvers and use knowledge learned efficiently and effectively in daily life.

**Unit Overview** – The unit overview provides a brief description of the concepts covered in each unit.

**Big Ideas and Essential Questions** - Big ideas create connections in learning. They anchor all the smaller isolated, facts together in a unit. Essential questions (questions that allow students to go deep in thinking) should answer the big ideas. Students should not be able to answer Essential Questions in one sentence or less. Big ideas should be the underlying concepts, themes, or issues that bring meaning to content.

**Concept** – A subtopic of the main topic of the unit

**Instructional Model** – The structures, guidelines or model in which students engage in a particular content that ensures understanding of that content.

### Parent Supports:

The following resources provide parents with ideas to support students in mathematical understanding

- [Advice for Parents: Helping Children with Math](#)
- [How Math Should be Taught](#)
- [The Most Important Mathematical Habit of Mind](#)
- [Math: Why Doesn’t Yours Look Like Mine?](#)
Instructional Model:

The instructional model for mathematics is the Concrete-Representational-Abstract Model (CRA). The CRA model allows students to access mathematics content first through a concrete approach (“doing” stage) then representational (“seeing” stage) and then finally abstract (“symbolic” stage). The CRA model allows students to conceptually develop concepts so they have a deeper understanding of the mathematics and are able to apply and transfer their understanding across concepts and contents. The CRA model is implemented in grades K-12 in FBISD.

Math Workshop:

During math instruction in grades K-8 in FBISD, we follow the Math Workshop structures. Instruction during a math class follows one of the three structures: Task and Share, Mini Lesson, Guided Math and Learning Stations, and Guided Math and Learning Stations. The structure that is used each day is determined by the content covered as well as student need.

<table>
<thead>
<tr>
<th>Task and Share</th>
<th>Mini Lesson, Guided Math and Learning Stations</th>
<th>Guided Math and Learning Stations</th>
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<tr>
<td>Number Sense Routine</td>
<td>Number Sense Routine</td>
<td>Number Sense Routine</td>
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<tr>
<td>Math Task</td>
<td>Mini Lesson</td>
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<td></td>
<td>Guided Math</td>
<td>Learning Stations</td>
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<tr>
<td>Task Share and Student Reflective Closure</td>
<td>Student Reflective Closure</td>
<td>Student Reflective Closure</td>
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**Number Sense Routine** – An engaging accessible, purposeful routine to begin math class that promotes a community of positive mathematics discussion and thinking.

**Math Task** – A problem-solving task that students work on in small groups. The teacher monitors and probes student thinking through questions. The task should have multiple entry points, allowing for all students to have access to the problem.

**Task Share with Student Reflective Closure** – Students come together as a whole class and discuss the various strategies they used to solve a rich mathematical task. Students ask questions, clarify their thinking, modify their work, and add to their collection of strategies.

**Mini Lesson** – A well-planned whole group lesson focused on the day’s learning intention and accessible to all levels of learners.

**Guided Math** – Small group instruction that allows the teacher to support and learn more about students’ understandings and misconceptions. Can include intervention, more on-level support, or enrichment.

**Learning Stations** – Activity in which students engage in meaningful mathematics and are provided with purposeful choices. Could include individual, partner or group tasks.

**Student Reflective Closure** – A deliberate and meaningful time for students to reflect on what they’ve learned and experienced during a math task, at activities in learning stations, or in a guided math group.
### Mathematical Process Standards:

The student uses mathematical process to acquire and demonstrate mathematical understanding. The student is expected to:

- **4.1A** Apply mathematics to problems arising in everyday life, society, and the workplace
- **4.1B** Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution
- **4.1C** Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems
- **4.1D** Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate
- **4.1E** Create and use representations to organize, record, and communicate mathematical ideas
- **4.1F** Analyze mathematical relationships to connect and communicate mathematical ideas
- **4.1G** Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication

### Grading Period 1

**Unit 1: Creating a Mathematical Community through Graphing**

**Estimated Date Range: August 14 – 20**

**Unit Overview:** In this unit, students will build on their knowledge of pictographs and bar graphs from First Grade. Students will be introduced to writing and solving word problems involving addition or subtraction using data represented within pictographs and bar graphs with intervals of one. They will also draw conclusions and make predictions from information in a graph. This unit is set up with graphing ideas to help teachers and students learn about each other and begin to develop routines and procedures for math class.

In addition to graphing, the intent of this unit is to establish a foundation for upcoming units by reinforcing and supporting student ownership of learning. The emphasis will be on the creation of a positive and respectful learning environment through highlighting attributes of Profile of a Graduate, Growth Mindset, and the implementation and support of structured Math Workshop routines and procedures. The goal is to build a community of learners with a mathematical mindset in which students value their mistakes and struggles, and feel safe to engage in mathematical discourse.

**Big Ideas:**
- Data helps us make sense of information in our world.
- Organization of information shows relationships.
- Data can be collected, organized, sorted, and analyzed in a variety of ways by creating real-object and picture graphs.

**Essential Questions:**
- Why and how do we sort information?
- How do graphs help you to interpret data?
What are some ways we can organize data?

### Concepts within Unit #1

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<tr>
<th>Concept #1: Graphing and Setting Up Guided Math</th>
<th>TEKS</th>
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<tr>
<td></td>
<td>Link to TEKS</td>
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<td>2.10B, 2.10C, 2.10A, 2.10D</td>
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### Unit 2: Numeration

**Estimated Date Range:** August 21 – September 26

**Unit Overview:** In this unit, students will gain a deeper understanding of place value by representing the value of digits by using concrete models, pictorial models and symbolic representations. Students will compare and order whole numbers and decimals by using concrete and pictorial models and using symbols to represent the comparisons. Previously, students composed and decomposed numbers to one hundred thousand. In this unit, students will compose and decompose to the billions and decimal places. Fractions and decimals will become intertwined in the unit as students begin to determine the relationship between the two. By the end of the year, students will be able to interpret the values of each place. Understanding the difference between place and value is foundational as students move to using traditional algorithms in the future.

**Big Ideas:**
- Know that numbers can be represented in a variety of ways, which represent the same quantity.
- Understand that as you move to the left or right in the place value system, the value of each digit increases in groups of 10 or decreases in groups of 10.
- Understand that the base 10 number system uses digits 0-9, groups of 10 and place value to understand number structure.

**Essential Questions:**
- How can numbers be represented?
- What types of relationships do place values display?
- How does the position of a digit in a number affect its value?

### Concepts within Unit #2

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<th>Concept #3: Relating Decimals and Fractions</th>
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<td>4.2G, 4.2E, 4.2H</td>
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### Unit 3: Addition and Subtraction (Teach Stem & Leaf and Input / Output Tables)

**Estimated Date Range:** Sep. 30 – Oct. 10

**Unit Overview:** Previously, students represented one and two step problems by adding a subtracting with strategies such as picture models. In this unit, students will add and subtract whole numbers and decimals to the hundredths place using the standard algorithm. As students move through the learning progressions, they will apply their understanding by representing multi-step problems involving the four operations with whole numbers using strip diagrams, equations and input-output tables. Finally, students will represent data on a frequency table, dot plot marked with whole numbers and decimals. Understanding how the base 10 system aids in math computation will assist students as they advance in mathematical understanding.

**Big Ideas:**
• Know that the Base 10 System helps solve addition and subtraction problems because adding and subtracting digits in the correct places yields the correct solution.
• Know that mathematical operations and strategies are used in a variety of ways in daily life such as adding/subtracting money, sports, and cooking.
• Understand how to use tools such as input/output tables when solving math problems, knows why the process was appropriate, and can justify it with reasons and evidence.
• Know that stem-leaf plots and frequency tables can help solve problems because they are visual representations of data that has been collected and displayed.

Essential Questions:
• How does the Base 10 system help solve addition and subtraction problems?
• In what ways are mathematical operations and strategies used to solve problems in everyday life?
• How do you know when and if your strategy for solving problems is correct?
• How can a graph help organize information in order to solve problems?
• How can data and data displays be purposeful and powerful?
• Why is it important to be aware of factors that may influence conclusions, predictions, and/or decisions derived from data?

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<thead>
<tr>
<th>Concepts within Unit #3</th>
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<tr>
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Grading Period 2

Unit 3: Addition and Subtraction (Teach Stem & Leaf and Input / Output Tables)
Estimated Date Range: Oct. 15 – Oct. 23

Unit Overview: Previously, students represented one and two step problems by adding a subtracting with strategies such as picture models. In this unit, students will add and subtract whole numbers and decimals to the hundredths place using the standard algorithm. As students move through the learning progressions, they will apply their understanding by representing multi-step problems involving the four operations with whole numbers using strip diagrams, equations and input-output tables. Finally, students will represent data on a frequency table, dot plot marked with whole numbers and decimals. Understanding how the Base 10 system aids in math computation will assist students as they advance in mathematical understanding.

Big Ideas:
• Know that the Base 10 System helps solve addition and subtraction problems because adding and subtracting digits in the correct places yields the correct solution.
• Know that mathematical operations and strategies are used in a variety of ways in daily life such as adding/subtracting money, sports, and cooking.
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• Know that stem-leaf plots and frequency tables can help solve problems because they are visual representations of data that has been collected and displayed.

Essential Questions:
• How does the Base 10 system help solve addition and subtraction problems?
• In what ways are mathematical operations and strategies used to solve problems in everyday life?
• How do you know when and if your strategy for solving problems is correct?
• How can a graph help organize information in order to solve problems?
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<tr>
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<tr>
<td>Concept #1: Addition and Subtraction</td>
<td>4.4A, 4.5A, 4.5B, 4.9A, 4.4G, 4.9B, 4.10B</td>
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**Unit 4: Multiplication and Division**

Estimated Date Range: Oct. 24 – Dec. 5

**Unit Overview:** In this unit, students will fluently solve one and two step problems that involve multiplication and division strategies (including interpreting remainders). Students will also revisit representing multiple step problems using all four operations (addition, subtraction, multiplication, and division) using strip diagrams and equations with a letter standing for unknown quantities. In the previous year, students solved one and two step problems by multiplying up to a two-digit by a one-digit whole number. By the end of the year, students should be able to fluently use strategies, including properties to multiply whole numbers up to a four-digits by a one-digit and a two-digit whole numbers by a two-digit whole number. Additionally, in the previous grade level, students were introduced to divisibility rules based on even and odd numbers. Students will use the same divisibility rules to represent quotients of up to a four-digit whole number divided by a one-digit whole number divisor using various strategies and the standard algorithm by the end of the year.

**Big Ideas:**
- Know that there is a relationship that exists between multiplication and division.
- Know that mathematical operations and strategies may be used to represent and solve a variety of problem situations in everyday life.
- Know that there are various strategies that can be used to represent products and quotients of whole numbers.
- Understands what has been done, knows why the process was appropriate, and can support it with reasons and evidence.

**Essential Questions:**
- Why is multiplication the inverse of division?
- What strategies can we use to determine which operation is needed to solve a word problem? How can we prove that our strategy works?
- What strategies can be used to multiply and divide whole numbers?
- What are the traits of a good mathematician?

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<tr>
<td>Concept #2: Multiplying by One &amp; Two Digit Numbers</td>
<td>4.4H, 4.5A, 4.5B, 4.9A, 4.4B, 4.4C, 4.4D, 4.4G</td>
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</table>
Concept #3: Estimating Quotients & Understanding Division
4.4H, 4.5A, 4.4E, 4.4F, 4.4G

**Unit 5: Geometry**
Estimated Date Range: Dec. 10 – Dec. 19

**Unit Overview:** In this unit, students will identify geometric attributes such as lines, rays, angles, etc. and classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. By the end of the year, students will be able to use a protractor to determine the approximate measures of angles in degrees to the nearest whole number and to apply knowledge of right angles to identify angles greater than, less than, or equal to 90°. Additionally, students will find lines of symmetry in two-dimensional figures as well as represent data and solve one- and two-step problems using dot plots, stem-and leaf plots, and frequency tables and analyze the data from those graphs.

**Big Ideas:**
- Mathematicians can identify specific attributes of geometric figures.
- Mathematicians can also use tools to measure the attributes of geometric figures.
- Objects can be analyzed, sorted, and compared by attributes.
- Geometric figures exist in our world in many different forms.
- Data can be displayed using a variety of charts, tables, and graphs.

**Essential Questions:**
- What specific attributes do geometric figures have?
- What are the ways to describe shapes?
- What tools can we use to measure attributes of geometric figures?
- How do we use these tools to measure attributes of geometric figures?
- How are geometric figures displayed and used in our world?
- What are some ways we can organize and display data?

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<th>Concepts within Unit #6</th>
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<tr>
<td>Concept #2: Understanding, Measuring, Adding and Subtracting Angles</td>
<td>4.7C, 4.4A, 4.7A, 4.7B, 4.7D, 4.7E</td>
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</tbody>
</table>

**Grading Period 3**

**Unit 5: Geometry (cont.)**
Estimated Date Range: Jan. 7 – Jan. 24

**Unit Overview:** In this unit, students will identify geometric attributes such as lines, rays, angles, etc. and classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. By the end of the year, students will be able to use a protractor to determine the approximate measures of angles in degrees to the nearest whole number and to apply knowledge of right angles to identify angles greater than, less than, or equal to 90°. Additionally, students will find lines of symmetry in two-dimensional figures as well as represent data and solve one- and two-step problems using dot plots, stem-and leaf plots, and frequency tables and analyze the data from those graphs.

**Big Ideas:**
- Mathematicians can identify specific attributes of geometric figures.
- Mathematicians can also use tools to measure the attributes of geometric figures.
- Objects can be analyzed, sorted, and compared by attributes.
• Geometric figures exist in our world in many different forms.
• Data can be displayed using a variety of charts, tables, and graphs.

Essential Questions:
• What specific attributes do geometric figures have?
• What are the ways to describe shapes?
• What tools can we use to measure attributes of geometric figures?
• How do we use these tools to measure attributes of geometric figures?
• How are geometric figures displayed and used in our world?
• What are some ways we can organize and display data?

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<tr>
<th>Concepts within Unit #6</th>
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<tbody>
<tr>
<td>Concept #2: Understanding, Measuring, Adding and Subtracting Angles</td>
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<td>Concept #3: Triangles</td>
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<td>Concept #4: Quadrilaterals</td>
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<td>Concept #5: Lines of Symmetry</td>
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<td>Concept #6: Dot Plots and Stem-and-Leaf</td>
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Unit 6: Fractions
Estimated Date Range: Jan. 27 – Mar. 6

Unit Overview: In this unit, students will relate fractions to decimals through the hundredths place including placing them on a number line. They will compose and decompose fractions into unit fractions and represent them as a sum of fractions with the same denominator using objects and pictorial models. Students will compare two fractions and determine if two fractions are equivalent. Students will represent, with objects and pictorial models, and solve addition and subtraction fractions with the same denominator and determine the reasonableness of sums and differences using benchmark fractions.

Big Ideas:
• Good mathematicians know that mathematics provides a variety of ways to express relationships between numbers, including fractions and decimals through concrete objects, pictorial models and real world situations.
• The relationship between amount of fractional parts and size of the parts is foundational for comparing fractions.
• Know that there are various strategies that can be used to represent products and quotients of whole numbers.
• Numbers can be compared by their values.
• Define a fraction as partitioning one whole into equal parts.
• Develop an understanding of benchmark fractions.

Essential Questions:
• How do we show relationships between numbers?
• How can models help us see how numbers are related?
• Why is it important to understand the relationship between amount of fractional parts and size of the parts?
• Why is it important to compare fractions?
• What does partition mean?
• What is a benchmark fraction?
How do we show relationships between decimals and fractions?

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<tr>
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<td>Concept #1: Understanding Fraction Meaning</td>
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<tr>
<td>Concept #2: Manipulating Fractions</td>
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<tr>
<td>Concept #3: Adding and Subtracting Fractions</td>
<td>4.3E, 4.3F</td>
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**Grading Period 4**

**Unit 6: Fractions (cont.)**

**Unit Overview:** In this unit, students will relate fractions to decimals through the hundredths place including placing them on a number line. They will compose and decompose fractions into unit fractions and represent them as a sum of fractions with the same denominator using objects and pictorial models. Students will compare two fractions and determine if two fractions are equivalent. Students will represent, with objects and pictorial models, and solve addition and subtraction fractions with the same denominator and determine the reasonableness of sums and differences using benchmark fractions.

**Big Ideas:**
- Good mathematicians know that mathematics provides a variety of ways to express relationships between numbers, including fractions and decimals through concrete objects, pictorial models and real world situations.
- The relationship between amount of fractional parts and size of the parts is foundational for comparing fractions.
- Know that there are various strategies that can be used to represent products and quotients of whole numbers.
- Numbers can be compared by their values.
- Define a fraction as partitioning one whole into equal parts.
- Develop an understanding of benchmark fractions.

**Essential Questions:**
- How do we show relationships between numbers?
- How can models help us see how numbers are related?
- Why is it important to understand the relationship between amount of fractional parts and size of the parts?
- Why is it important to compare fractions?
- What does partition mean?
- What is a benchmark fraction?
- How do we show relationships between decimals and fractions?

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<tr>
<th>Concepts within Unit #6</th>
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<tbody>
<tr>
<td>Concept #3: Adding and Subtracting Fractions</td>
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</table>
Unit 7: Measurement  
Estimated Date Range: Mar. 25 – Apr. 23

**Unit Overview:** In this unit, students will solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate. Students will also solve problems related to perimeter and area of rectangles where dimensions are whole numbers. Students will use models to determine the formulas for the perimeter of a rectangle \((l + w + l + w \text{ or } 2l + 2w)\), including the special form for perimeter of a square \((4s)\) and the area of a rectangle \(l \times w\). Students will identify relative sizes of measurement units within the customary and metric systems as well as convert measurements within the same measurement system, from a smaller unit to a larger unit or a larger unit into a smaller unit when given other equivalent measures.

**Big Ideas:**
- Determining the appropriate solution for measurement depends on the type of measurement involved.
- Area measures the space inside of an object while perimeter measures the lengths around the outside of an object.
- The perimeter can change when the area remains the same.

**Essential Questions:**
- How will I know what standard measurement to use in each situation?
- How are area and perimeter different?
- What is the relationship between area and perimeter?

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<td>Concept #2: Metric Measurement and Conversions</td>
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<td>Concept #3: Time</td>
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<tr>
<td>Concept #4: Area and Perimeter</td>
<td>4.5D, 4.5C</td>
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Unit 8: Personal Financial Literacy  
Estimated Date Range: Apr. 24 – Apr. 30

**Unit Overview:** In this unit, students will distinguish between fixed and variable expenses, calculate profit in a given situation, compare the advantages and disadvantages of various saving options, describe how to allocate weekly allowance among spending, saving, (including for college), and sharing. Lastly, students will describe the basic purpose of financial institutions, including keeping money safe, borrowing, and lending money.

**Big Ideas:**
- Important personal finance knowledge and skills help people become financially capable and responsible to make decisions when it comes to satisfying needs and wants.
- Understanding finances and persons using them effectively are essential to financial security.
- Mathematical operations and strategies may be used to represent and solve a variety of problem situations in everyday life.

**Essential Questions:**
- How can a person be financially secure?
- Why is fluency in computing important in life?
- How does understanding numerical operations help us use money?
### Unit 9: Problem Solving with Multiplication and Division

**Estimated Date Range:** May 1 – May 14

**Unit Overview:** In this unit, students will fluently solve one and two step problems that involve multiplication and division strategies (including interpreting remainders). Students will also revisit representing multiple step problems using all four operations (addition, subtraction, multiplication, and division) using strip diagrams and equations with a letter standing for unknown quantities.

**Big Ideas:**
- Know that there is a relationship that exists between multiplication and division.
- Know that mathematical operations and strategies may be used to represent and solve a variety of problem situations in everyday life.
- Know that there are various strategies that can be used to represent products and quotients of whole numbers.
- Understands what has been done, knows why the process was appropriate, and can support it with reasons and evidence.

**Essential Questions:**
- Why is multiplication the inverse of division?
- What strategies can we use to determine which operation is needed to solve a word problem? How can we prove that our strategy works?
- What strategies can be used to multiply and divide whole numbers?
- What are the traits of a good mathematician?

### Concepts within Unit #8

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### Concepts within Unit #9

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<th>Concept #1: Estimating Quotients &amp; Understanding Division</th>
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<td>4.4H, 4.5A, 4.4E, 4.4F, 4.4G</td>
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### Unit 10: Solidifying Fourth Grade

**Estimated Date Range:** May 15 – May 28

**Unit Overview:** In this unit, students will focus on strengthening their ability in the concepts of decimals, multiplication and division, and fractions. These concepts are crucial for success in 5th grade as 4th grade concepts build to multiplication and division of decimals and fractions and addition and subtraction of fractions with unlike denominators.

**Big Ideas:**
- know that numbers can be represented in a variety of ways that represent the same quantity
- know that fractions and decimals express a relationship between numbers
- know that mathematical operations and strategies may be used to represent and solve a variety of problem situations in everyday life.

**Essential Questions:**
- How can numbers be represented?
- What type of relationship do fractions and decimals display?
What strategies can we use to determine which operation is needed to solve a word problem? How can we prove that our strategy works?

<table>
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<tr>
<th>Concepts within Unit #10</th>
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<td>Concept #1: Fractions</td>
<td>4.2G, 4.3D, 4.3E, 4.3A, 4.3B, 4.3C, 4.3F, 4.3G</td>
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<tr>
<td>Concept #2: Addition and Subtraction of Decimals</td>
<td>4.4A, 4.5A, 4.4G, 4.9B</td>
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<td>Concept #3: Multiplication and Division</td>
<td>4.4H, 4.4D, 4.4E, 4.4F</td>
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