Second Grade Instructional Framework

Cluster 1	**Building a Mathematical Community while Working with numbers within 20**
Cluster 2	**Adding and Subtracting within 100**
Cluster 3	**Skip Counting in Multiple Contexts**
Cluster 4	**Understanding Place Value to Read, Write and Compare Numbers**
Cluster 5	**Adding and Subtracting within 1,000**
Cluster 6	**Working with Linear Measurement**
Cluster 7	**Data and Two Step Problem Solving**
Cluster 8	**Problem Solving with Money**
Cluster 9	**Reasoning with Shapes**

Introduction

The purpose of this document is to connect and sequence mathematical ideas to enable teachers to plan learning opportunities for students to develop a coherent understanding of mathematics. **Clusters** and sequencing are designed to foster students' meaning making of the connections among mathematical ideas and procedures. This meaning making occurs over time. Therefore, the concepts are included in multiple clusters with increasing depth. They build across the year beginning with conceptual understanding and moving toward procedural fluency.

Each cluster includes a list of related **content standards** and a range of **suggested duration**. Standards indicate the mathematics expectations of students by the end of the school year. Standards are introduced and developed throughout the year, so the fact that a content standard is listed in a particular cluster does not indicate that it is to be mastered in the cluster. In some clusters, strikethroughs in the content standards denote the portion of the standard that will be taught later. In other clusters, the full standard appears, but suggestions about the intended focus are noted in the cluster descriptions. Because standards may be included in clusters long before mastery is expected, formative assessment is an essential tool for instructional planning and reporting student progress. This assessment naturally occurs as teachers elicit students' mathematical thinking and reasoning while doing mathematics.

Particular **Standards for Mathematical Practice** are indicated for each cluster. The listed suggestions are a guide for teachers. While the practices listed may lend themselves particularly well to the cluster's content, this does not imply that they are the only practices students will use. Students doing rich mathematical tasks will naturally engage in many mathematical practices as they do mathematics. During instruction teachers may observe and decide to highlight the other practices students are using beyond those listed in the cluster.

Each cluster includes a section called **"What is the mathematics?"** that describes the significant concepts and connections within the standards necessary for students to make sense of and use the mathematics. A second section called **"Important Considerations"** provides guidance based on student learning progressions as well as ideas and models for teaching within problem-solving situations. Problem-solving and mathematical reasoning define what it means to do mathematics. Rich tasks (including word problems) provide students with concrete contexts to use as they are introduced to new mathematics. Later, work within such tasks allows students to develop understanding and eventually to demonstrate mastery. Rich tasks with multiple entry and exit points allow for natural differentiation of instruction and are accessible for all students.

The initial cluster at each grade includes a focus on **building mathematical community**. Learning mathematics involves productive struggle during problem-solving and meaningful discourse as students share strategies and explain their thinking. This requires individual students to have a mathematical mindset, a belief that they can learn and do mathematics, so they will take risks when solving non-routine tasks. Collectively, students must share ideas publicly as they critique mathematical ideas with peers and teacher. A safe community where mistakes and struggles are valued as learning opportunities is essential. Mathematical norms about how students do and talk about mathematics need to be explicitly established in the same way that other routines and expectations are introduced at the beginning of a school year.

Cluster 1: Building a mathematical community while working with numbers within 20

Duration: 3-4 weeks

Content Standards:
This list includes standards addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Note strikethroughs and recommendations in the Important Considerations section for more information.

NC.2.MD.6
Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points and represent whole-number sums and differences, within ~~100~~ (only up to 20 at this point), on a number line diagram

NC.2.OA.2
Demonstrate fluency with addition and subtraction, within 20, using mental strategies.

NC.2.OA.3
Determine whether a group of objects, within 20, has an odd or even number of members by:

- Pairing objects, then counting them by 2s.
- Determining whether objects can be placed into two equal groups.
- Writing an equation to express an even number as a sum of two equal addends

Mathematical Practices:
1. Make Sense of Problems and Persevere in Solving Them
2. Reason Abstractly and Quantitatively
3. Construct Viable Arguments and Critique the Reasoning of Others
4. Model with Mathematics
5. Use Appropriate Tools Strategically
6. Attend to Precision
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

What is the Mathematics?
A priority for this cluster is to establish a foundation for all mathematical work by creating a positive and respectful climate for learning. The goal is for students feel safe to engage in discourse around mathematical topics. Such mathematical discourse can reveal understandings and misunderstandings, boost memory, promote deeper reasoning, foster language development, and support the development of social skills. This mathematical community will encourage learners to have a mathematical mindset in which they persevere and learn from mistakes.

- Students work through open-ended tasks, number talks, and patterning to promote mathematical mindset and build classroom community.
- Students learn mathematical routines and expectations for talking about math including sharing their own thinking, listening, and critiquing the reasoning of others.
- In first grade, students added and subtracted within 20, but only demonstrated fluency within ten. This cluster calls for students to build off of their first grade work as they develop fluency with addition and subtraction within 20 using mental strategies (make a ten, counting on, counting back, doubles, doubles +1, etc.).
- In this cluster, MD.6 is incorporated through the use of the number line. Students should understand that when using a number line the distance between the numbers is what is being "counted" (iteration), rather than counting the tick marks.
- Students pair objects and then count them by 2's to explore concepts of even and odd. Through this process, they practice skip counting by 2's.

- Students understand that even numbers can be shared fairly into two equal groups (ex. 8 is 4 and 4). Odd numbers will have one left over when sharing the number into two equal groups (ex. 9 is 4 and 4 with 1 left over).
- By exploring sharing of counters students discover which numbers are even and odd. They record these discoveries with equations (ex. 4 + 4 = 8). They note these numbers on the number line and notice the pattern that every other number is even or odd.
- Grouping objects to determine if sets are odd or even connects to the "near doubles" mental math strategy (ex., If I know 4 + 4, I can add one more to find 4 + 5).

Important Considerations

- As with all standards, students are not expected to demonstrate mastery until the end of the year. At this point, students should begin working with mental math strategies, which will be practiced throughout the school year.
- Fluency does not simply mean memorization, but rather flexible, efficient, and accurate thinking using multiple strategies. A student demonstrating fluency uses a mixture of "just knowing" facts, using known patterns (ex., adding/subtracting 0), and efficiently employing strategies (ex, make a ten, doubles, compensation, using relationship between addition and subtraction).
- Students are working within 20 in this cluster, including on the number line.
- Students represent their thinking in multiple ways, including equations.
- Be careful to develop a robust understanding of even and odd rather than teaching students to look at the numeral in the ones place. Understanding that even numbers are those that can be shared fairly into two equal groups is an important foundational concept for divisibility in upper elementary grades.

Cluster 2: Adding and Subtracting within 100

Duration: 5-6 weeks

Content Standards:
This list includes standards addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Note strikethroughs and recommendations in the Important Considerations section for more information.

NC.2.OA.1
Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving:

- One-Step problems:
  - Add to/Take from - Start Unknown
  - Compare - Bigger Unknown
  - Compare - Smaller Unknown
- ~~Two-Step problems involving single digits:~~
  - ~~Add to/Take from-Change Unknown~~
  - ~~Add to/Take From-Result Unknown~~

NC.2.NBT.2
Count within ~~1,000~~ (100 at this point in the year); skip-count by 5s, 10s~~, and 100s~~.
NC.2.NBT.5
Demonstrate fluency with addition and subtraction, within 100, by:

- Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Comparing addition and subtraction strategies, and explaining why they work.
- Selecting an appropriate strategy in order to efficiently compute sums and differences.

NC.2.NBT.6
Add up to three two-digit numbers using strategies based on place value and properties of operations [within 100].
NC.2.NBT.8
Mentally add 10 ~~or 100~~ to a given number [within]100~~–900~~, and mentally subtract 10 ~~or 100~~ from a given number 100~~–900~~.
NC.2.MD.6
Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points and represent whole-number sums and differences, within 100, on a number line.

Mathematical Practices:
1. Make Sense of Problems and Persevere in Solving Them
2. Reason Abstractly and Quantitatively
3. Construct Viable Arguments and Critique the Reasoning of Others
4. Model with Mathematics
5. Use Appropriate Tools Strategically
6. Attend to Precision
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

What is the Mathematics?

In first grade, students developed and understanding on place value within 100. This cluster calls for students to apply this understanding as they employ strategies to fluently add and subtract within the context of word problems.

- Students communicate their thinking with multiple representations (ex., manipulatives, pictures, number lines, equations, etc.). The standard algorithm is not the expectation for second grade (mastery is expected in grade 4).
- Reasoning strategies from Cluster 1 should be revisited and applied to larger numbers within this cluster (ex. The double strategy of 4 + 4 = 8 can be used to solve 40 + 40 = 80 and "make a ten" becomes "make a hundred.").
- Students are introduced to mathematical property as ways to efficiently solve problems, but they do not need to know the formal names or definition of the properties. (ex. What do you notice about 4 + 5 and 5 + 4?).
- Place value knowledge is used to add and subtract using counting up and back by tens and also to decompose numbers into tens and ones as a strategy to add and subtract. (ex. In 23+35, 35 could be decomposed to three tens and five ones and they could count on to find the sum. 23, 33, 43, 53, 54, 55, 56, 57, 58).
- In this cluster MD.6 is incorporated through the use of the number line. Students should understand that when using a number line that the distance between the numbers is what is being "Counted" (Iteration), rather than the tick marks.
- Students engage in one-step word problems of all types with a particular focus on Add to/Take from-Start Unknown; Compare-Bigger Unknown, Compare-Smaller Unknown.

Important Considerations

Problem Types are presented early in the school year because research indicates students need distributed practice over time with increasing difficulty in number ranges.

- The concepts of addition and subtraction are introduced before the concept of place value because students need to solidify their understanding of ten's and 1's. The number ranges that students are working does not require students to have a firm foundation in place value to the thousands at this time.
- 2.OA.1 only includes one-step problems during this cluster. Two-step problems are included in Cluster 6.
- Students should be taught to focus on the action of the problem rather than identifying keywords. Keyword strategies are often misleading, and they don't work in every problem situation. Students who rely on keywords tend to ignore the context of the problem. Instead, they pull out the numbers and "do something with them" based on the keyword. When students can identify the action (operation) and the unknown (what they are solving for), they can solve problems successfully.

Cluster 3: Skip Counting in Multiple Contexts

Duration: 1-2 weeks

Content Standards:
This list includes standards addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Note strikethroughs and recommendations in the Important Considerations section for more information.

NC.2.MD.7
Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
NC.2.NBT.2
Count within [100] ~~1,000~~; skip-count by 5s, 10s, ~~and 100s.~~
NC.2.OA.4
Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

Mathematical Practices:
1. Make Sense of Problems and Persevere in Solving Them
2. Reason Abstractly and Quantitatively
3. Construct Viable Arguments and Critique the Reasoning of Others
4. Model With Mathematics
5. Use Appropriate Tools Strategically
6. Attend to Precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

What is the Mathematics?
- Skip counting is a way to see patterns and connections in math. It will be developed as students work within many areas of math such as adding, subtracting, telling time, working with arrays, and counting money (later in the school year). It is a foundational skill that expands over time.
- Arrays are a model for future multiplication instruction. For multiplication to make sense to children, they must have to ample concrete and representational experiences with the idea of multiplication prior to trying to achieve flexibility with multiplication. In second grade, we should use the rows and columns of arrays as a more efficient way to count and a model of repeated addition. Students should also understand that a 3 x 4 array can be expressed as 3 + 3 + 3 + 3 or 4 + 4 + 4. Counting the items in an array is a form of skip counting.

Important Considerations
- MD.7 and NBT.2 are presented early because research indicates students need distributed practice of these concepts over time.
- Tools such as number lines and hundred charts should be used to support skip counting.

Cluster 4: **Understanding Place Value to Read, Write and Compare Numbers**

Duration: 4-5 weeks

Content Standards:
This list includes standards addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Note strikethroughs and recommendations in the Important Considerations section for more information.

NC.2.NBT.1
Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones.
- Unitize by making a hundred from a collection of ten tens.
- Demonstrate that the numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds, with 0 tens and 0 ones.
- Compose and decompose numbers using various groupings of hundreds, tens, and ones.

NC.2.NBT.2
Count within 1,000; skip-count by 5s, 10s, and 100s.
NC.2.NBT.3
Read and write numbers, within 1,000, using base-ten numerals, number names, and expanded form.
NC.2.NBT.4
Compare two three-digit numbers based on the value of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

Mathematical Practices:
1. Make Sense of Problems and Persevere in Solving Them
2. Reason Abstractly and Quantitatively
3. Construct Viable Arguments and Critique the Reasoning of Others
4. Model with Mathematics
5. Use Appropriate Tools Strategically
6. Attend to Precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

What is the Mathematics?
During the first three clusters in second grade, students applied their knowledge of first grade place value concepts. Cluster 4 builds upon this knowledge as students explore the idea that a hundred is ten tens and that numbers greater than 100 are composed of some hundreds, some tens and some ones.
- Expanded form is an expression of place value.
- Previous work with operations will allow students to build their place value knowledge, so that future operations can build to larger numbers.

Important Considerations
- At this time of the year, students will have had experiences with multiple strategies for addition and subtraction. They should have the foundation in place necessary to begin working with place value concepts with larger numbers.
- Place value needs to be understood before problem solving within 1,000.
- Place value manipulatives need to be proportional. Base ten blocks and cubes are proportional because the ten is exactly ten times larger than the one. Dimes and pennies are not proportional because the dime is actually smaller than the penny.
- As students are modeling numbers to determine the number of hundreds, tens, and ones, they should have opportunities to name the same number in different ways (ex. 143 is 1 hundred, 4 tens, and 3 ones, but it could also be described as 14 tens and 3 ones). Students continue to build flexibility in naming numbers in different ways throughout the rest of the year.

Cluster 5: Adding and Subtracting within 1,000

Duration: 4-5 weeks

Content Standards:
This list includes standards addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Note strikethroughs and recommendations in the Important Considerations section for more information.

NC.2.NBT.6 (sums greater than 100 are possible)
Add up to three two-digit numbers using strategies based on place value and properties of operations.
NC.2.NBT.7
Add and subtract, within 1,000, relating the strategy to a written method, using:
- Concrete models or drawings
- Strategies based on place value
- Properties of operations
- Relationship between addition and subtraction

NC.2.NBT.8
Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.

NC.2.OA.1
Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving:
- One-Step problems:
  - Add to/Take from - Start Unknown
  - Compare - Bigger Unknown
  - Compare - Smaller Unknown
- ~~Two-Step problems involving single digits:~~
  - ~~Add to/Take from - Change Unknown~~
  - ~~Add to/Take From - Result Unknown~~

Mathematical Practices:
1. Make Sense of Problems and Persevere in Solving Them
2. Reason Abstractly and Quantitatively
3. Construct Viable Arguments and Critique the Reasoning of Others
4. Model with Mathematics
5. Use Appropriate Tools Strategically
6. Attend to Precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

What is the Mathematics?
- Place Value knowledge will be applied in composing and decomposing numbers within 1,000. For example, discussions should include questions like “How many hundreds will be left after taking away 300 from 743?”

Important Considerations

- Students are not expected to demonstrate mastery of these standards until the end of the year. At this point, students should begin working with addition and subtraction within 1,000, with the expectation that it will be practiced throughout the school year (e.g., through daily math routines such as number talks).
- In this cluster, teachers should begin with mental math and reasoning strategies.
- Students need to develop a number sense with large numbers before performing standard algorithms. (ex. If 5 + 5 = 10, what is 50 + 50? 500 + 500?) The standard algorithm is not the expectation for second grade.
- Relate familiar mathematics facts to more complex facts. (ex. if 400 + 400 = 800 what is 400 + 399? etc.) Students begin to make the connection that they can use the same reasoning strategies they used in K and 1, just now with larger numbers.
- Help students use the relationship between addition and subtraction to solve problems (ex. If 500 + 500 = 1000 what is 1000 - 500?).
- When teaching written strategies use visual representations such as drawings, number lines, hundreds boards; over reliance on a fixed representation decreases students' flexibility and efficiency because they continue to use the representation beyond when it is needed or when there is a more convenient strategy.
- Word problems provide a concrete, familiar context to explore addition and subtraction with three-digit numbers.

Cluster 6: Working with Linear Measurement

Duration: 2-3 weeks

Content Standards:
This list includes standards addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Note strikethroughs and recommendations in the Important Considerations section for more information.

NC.2.MD.1
Measure the length of an object in standard units by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
NC.2.MD.2
Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
NC.2.MD.3
Estimate lengths in using standard units of inches, feet, yards, centimeters, and meters.
NC.2.MD.4
Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
NC.2.MD.5
Use addition and subtraction, within 100, to solve word problems involving lengths that are given in the same units, using equations with a symbol for the unknown number to represent the problem.
NC.2.OA.1
Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving:

- One-Step problems:
  - Add to/Take from - Start Unknown
  - Compare - Bigger Unknown
  - Compare - Smaller Unknown
- Two-Step problems involving single digits:
  - Add to/Take from - Change Unknown
  - Add to/Take From - Result Unknown

Mathematical Practices:
1. Make Sense of Problems and Persevere in Solving Them
2. Reason Abstractly and Quantitatively
3. Construct Viable Arguments and Critique the Reasoning of Others
4. Model with Mathematics
5. Use Appropriate Tools Strategically
6. Attend to Precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

What is the Mathematics?
In this cluster, students will recognize the need for standard units of measure. They will estimate and then precisely measure objects using self-selected tools, while developing the understanding that linear measurement involves the iteration of units (i.e., inches, feet, yards, centimeters, and meters). Students will acquire specific skills such as how to align objects to the zero point on the ruler, interpret the meaning of numbers on measurement tools, and draw a connection between the use of physical objects as measurement tools (e.g., paper clips and cubes) and standard measurement tools (e.g., rulers).

Through hands-on experiences, students will also learn the inverse relationship between the size of a unit and number of units needed to measure a length. (e.g., It take fewer feet than inches to measure the length of a desk). After having many opportunities to work with measurement tools, students will solve real-world problems involving measurements.

Important Considerations

In first grade, students worked with non-standard units of linear measure, such as paper clips and cubes. It may be helpful to begin this cluster by drawing from students' prior experiences with non-standard measurement. It is important to establish a purpose for standard units of measure and develop crucial measurement skills prior to focusing on problem solving. When problem solving, pose a variety of problem types with unknowns in all positions.

- Engaged in authentic measurement tasks throughout this cluster.
- For length comparison, use language such as "longer than" and "shorter than".
- As students learn to measure using different units, they should also be encouraged to discover personal benchmarks for each unit (e.g., one foot is the length from a student's elbow to pinky).
- Discuss reasonableness of measurement units (e.g., which is the most appropriate unit for measuring the length of the classroom).
- Linear measurement tools may also be considered number lines. While working with linear measurement, connections should be made to skills acquired while working with the number line.
- In this cluster, measurement is the context for word problems. Note that two-step word problems are introduced in this cluster, though students may have some experiences with them before this point when engaged in rich tasks.

Cluster 7: Data and Two Step Problem Solving

Duration: 1-2 weeks

Content Standards:
This list includes standards addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Note strikethroughs and recommendations in the Important Considerations section for more information.

NC.2.MD.10
Organize, represent, and interpret data with up to four categories.
- Draw a picture graph and a bar graph with a single-unit scale to represent a data set.
- Solve simple put-together, take-apart, and compare problems using information presented in a picture and a bar graph.

NC.2.OA.1
Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving:
- One-Step problems:
  - Add to/Take from - Start Unknown
  - Compare - Bigger Unknown
  - Compare - Smaller Unknown
- Two-Step problems involving single digits:
  - Add to/Take from - Change Unknown
  - Add to/Take From - Result Unknown

Mathematical Practices:
1. Make Sense of Problems and Persevere in Solving Them
2. Reason Abstractly and Quantitatively
3. Construct Viable Arguments and Critique the Reasoning of Others
4. Model with Mathematics
5. Use Appropriate Tools Strategically
6. Attend to Precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

What is the Mathematics?
In this cluster, students work with the process of data collection as they pose relevant questions, collect data to answer their questions, organize data, and interpret the results. Then, students solve one and two step problems related to the collected data.

In second grade, students work with both measurement data and categorical data. Measurement data should be based on standard units of linear measure from the previous cluster (e.g., pencil lengths, shoe lengths). With categorical data, objects are sorted into non-numeric categories (e.g., flavors of ice cream, ways students get home from school).

Important Considerations
- Two step problems are introduced here and continue with money in the next cluster.
- The nature of data lends itself to multi-step problems. Multiple questions can be asked about a data set such as how many more, how many less, and how many altogether, etc.
- Students discuss with each other what they notice about the information from a particular graph (Ex. What is this graph telling us?).

- Information on graphs can be combined to further describe data or to make decisions based on the data. (Ex. Bring lunch from home, Lunch from home but buy milk at school, lunch at school -- How many cartons of milk will the cafeteria need?)

Cluster 8: Problem Solving with Money

Duration: 1-2 weeks

Content Standards:
This list includes standards addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Note strikethroughs and recommendations in the Important Considerations section for more information.

NC.2.MD.8
Solve word problems involving:
- Quarters, dimes, nickels, and pennies within 99¢, using ¢ symbols appropriately.
- Whole dollar amounts, using the $ symbol appropriately

NC.2.OA.1
Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving:
- One-Step problems:
  - Add to/Take from - Start Unknown
  - Compare - Bigger Unknown
  - Compare - Smaller Unknown
- Two-Step problems involving single digits:
  - Add to/Take from - Change Unknown
  - Add to/Take From - Result Unknown

Mathematical Practices:
1. Make Sense of Problems and Persevere in Solving Them
2. Reason Abstractly and Quantitatively
3. Construct Viable Arguments and Critique the Reasoning of Others
4. Model with Mathematics
5. Use Appropriate Tools Strategically
6. Attend to Precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

What is the Mathematics?
In first grade, students identify quarters, dimes, and nickels and relate their values to pennies. Cluster 8 builds upon this knowledge as students solve real-world problems involving money.
- While students were initially introduced to coin values in first grade, a few days of this cluster will need to be spent on the reviewing coin names and values, and introducing conversions between and among coins. (ex: 5 dimes = 50¢ = 2 quarters)
- All problem types, including two-step problems should be incorporated into this work.

Important Considerations
- Since coin sizes are not proportional to their value, they should not be used as a model for place value. This cluster was separated from place value to minimize possible confusion for students.
- Draw on students' prior knowledge of skip counting of 5s and 10s.
- Students are expected to properly use money symbols (¢ and $)

Cluster 9: **Reasoning with Shapes**

Duration: 2-3 Weeks

Content Standards:
This list includes standards addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Note strikethroughs and recommendations in the Important Considerations section for more information.

NC.2.G.1
Recognize and draw triangles, quadrilaterals, pentagons, and hexagons, having specified attributes; recognize and describe attributes of rectangular prisms and cubes.
NC.2.G.3
Partition circles and rectangles into two, three, or four equal shares.

- Describe the shares using the words halves, thirds, half of, a third of, fourths, fourth of, quarter of.
- Describe the whole as two halves, three thirds, four fourths.
- Explain that equal shares of identical wholes need not have the same shape.

Mathematical Practices:
1. Make Sense of Problems and Persevere in Solving Them
2. Reason Abstractly and Quantitatively
3. Construct Viable Arguments and Critique the Reasoning of Others
4. Model with Mathematics
5. Use Appropriate Tools Strategically
6. Attend to Precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

What is the Mathematics?
In this cluster, quantity and number sense can be emphasized within geometry. For example, students will use quantity to describe attributes and shares.

- Mathematical vocabulary is essential in this cluster. The use of words like partition, halves, thirds, fourths, attributes, and the proper shape names are very important.
- While the use of the term “fraction” is not explicitly stated in second grade, the concepts of recognizing how many parts a whole is partitioned into, and whether or not the parts are of equal shares are. The focus of standard NC.2.G.3 is on equipartitioning (partitioning in equal parts), and developing language such as halves, thirds, and fourths. Second grade students should not be introduced to symbolic notation for fractions (ex. Students may describe an amount as “a third,” but is not expected to write ⅓).
- Students should have opportunities to draw and partition their own shapes, rather than solely use pre-partitioned representations. The experience of drawing their own shapes and partitions will allow students to develop the understanding that all parts must be equal.

Important Considerations

- 2D shapes and partitioning should be taught before 3D Shapes
- Partitioning can be introduced by folding paper shapes.
- When given a circle or rectangle, students must be able to recognize whether or not it is partitioned equally into two, three, or four shares. Sorting non-examples from examples are helpful with this skill.