Matanuska-Susitna Borough School District
Summary of Second Grade Math Standards

MAJOR, SUPPORTING, AND ADDITIONAL CLUSTERS FOR SECOND GRADE

All clusters are important and need to be taught for student success. The major clusters emphasize the depth of conceptual understanding and require more time for students to master the concepts. The supporting and additional clusters will help expand knowledge of the major clusters.

Key: **Major Clusters** ■ **Supporting Clusters** □ **Additional Clusters** ○

2.OA.1	■ Represent and solve problems involving addition and subtraction.
2.OA.2	■ Add and subtract using numbers up to 20.
2.OA.3-4	□ Work with equal groups of objects to gain foundations for multiplication.
2.OA.5	□ Identify and continue patterns.
2.NBT.1-4	■ Understand place value.
2.NBT.5-9	■ Use place value understanding and properties of operations to add and subtract.
2.MD.1-4	■ Measure and estimate lengths in standard units.
2.MD.5-6	■ Relate addition and subtraction to length.
2.MD.7-8	□ Work with time and money.
2.MD.9-10	■ Represent and interpret data.
2.G.1-3	○ Reason with shapes and their attributes.

Second Grade Focal Points

Highlights: Major Clusters

- Use part whole strategies to solve and estimate the answers to addition and subtraction.
- Students need to understand that “nested” within whole units is a range of possibilities for subdivision and recombining.
- Students need frequent work with place value concepts.
    - Use measurement as a vehicle for addition and subtraction. Show how length and height are related to addition and subtraction
    - Equal sign means equality not just an answer to math problems

Fluency

Fluency means accuracy (attending to precision), efficiency (using well-understood strategies with ease), and flexibility (using strategies such as making 10 or breaking apart numbers).

2.NBT.5 Add/subtract within 100 use paper and pencil (tools)
2.OA.2 Single-digit sums and differences (sums up to 20 by the end of Grade 2)

2nd Grade Math

Instructional Focus:

In Grade 2: Instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.

1. Students extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).
2. Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000 by applying their understanding of models for addition and subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.
3. Students recognize the need for standard units of measure (centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.
4. Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.
5. Estimation moves from approximating concrete objects to a strategy for checking if any answer is reasonable.

Operations and Algebraic Thinking

2.OA.1 Represent and solve problems involving addition and subtraction

Standard	Objective
2.OA.1. Use addition and subtraction strategies to estimate, then solve one- and two-step word problems (using numbers up to 100) involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions (e.g., by using objects, drawings and equations). Record and explain using equation symbols and a symbol for the unknown number to represent the problem.	Students will: • Apply estimation strategies to addition and subtraction word problems using numbers up to 100. • Solve and model one and two step word problems using numbers up to 100 that have unknown subtrahends, addends, or totals by using models. • Write an equation to represent the problem. • Communicate orally and in written form their thinking in solving the problem. • Create their own word problems that use numbers up to 100.

Examples

Estimation-Students who can use estimation strategies can judge "reasonableness" in their final answers and calculator use. Using a variety of estimation strategies such as front-end estimation, rounding, and compatible numbers build a students' sense of number.

For example: 255 + 47
Front-end 300 + 50
Round to nearest ten or hundred 300+ 50 or 260 + 50
Compatible numbers 250 + 50

ONE STEP WORD PROBLEMS

There are 15 stickers on the page. Brittany put some more stickers on the page. There are now 22 stickers on the page. How many stickers did Brittany put on the page?
15 + □ = 22

John caught 25 salmon in his net. 5 salmon escaped before he could get them on shore. How many salmon are left in his net?
25-5=□

TWO STEP WORD PROBLEMS

There are 9 purple marbles and 6 blue marbles in the bag. Mary put in 8 more marbles. How many marbles are in the bag now?
9 + 6 + 8 = □

There are 8 reindeer, 3 moose, and some bears at the zoo. There is a total of 17 animals at the zoo. How many bears are there?
8+3+□=17

There are 9 carrots on the plate. Brody ate 5 carrots. Mother put 7 more carrots on the plate. How many carrots are on the plate now?
9 –5 + 7 = □

Read: Betcha by Stuart Murphy

Result Unknown: There are 29 students on the playground. Then 18 more students showed up. How many students are there now?

29 + 18 = □

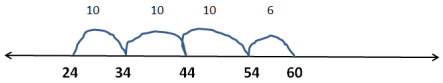
Change Unknown: There are 29 students on the playground. Some more students show up. There are now 47 students. How many students came?

29 + = 47

Start Unknown: There are some students on the playground. Then 18 more students came. There are now 47 students. How many students were on the playground at the beginning?

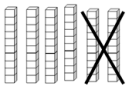
□ + 18 = 47

One-Step Example: Some students are in the cafeteria. 24 more students came in. Now there are 60 students in the cafeteria. How many were in the cafeteria to start with? Use drawings and equations to show your thinking. Student A: I read the equation and thought about how to write it with numbers. I thought, "What and 24 makes 60?" So, my equation for the problem is □ + 24 = 60. I used a number line to solve it. I started with 24. Then I took jumps of 10 until I got close to 60. I landed on 54. Then, I took a jump of 6 to get to 60. So, 10 + 10 + 10 + 6 = 36. So, there were 36 students in the cafeteria to start with.

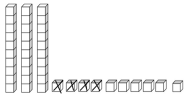


Student B: I read the equation and thought about how to write it with numbers. I thought, "There are 60 total. I know about the 24. So, what is 60 – 24?" So, my equation for the problem is 60 – 24 = □ I used place value blocks to solve it.

I started with 60 and took 2 tens away.



needed to take 4 more away. So, I broke up a ten into ten ones. Then, I took 4 away.

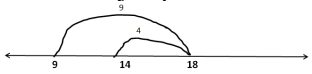


That left me with 36. So, 36 students were in the cafeteria at the beginning. 60 – 24 = 36

Two-Step Example: There are 9 students in the cafeteria. 9 more students come in. After a few minutes, some students leave. There are now 14 students in the cafeteria. How many students left the cafeteria? Use drawings and equations to show your thinking.

Student A

I read the equation and thought about how to write it with numbers: 9 + 9 - □ = 14. I used a number line to solve it. I started at 9 and took a jump of 9. I landed on 18. Then, I jumped back 4 to get to 14. So, overall, I took 4 jumps. 4 students left the cafeteria.

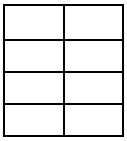
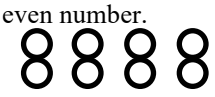
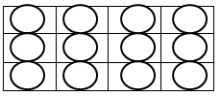


Student B

I read the equation and thought about how to write it with numbers: 9 + 9 - □ = 14. I used doubles to solve it. I thought about double 9s. 9 + 9 is 18. I knew that I only needed 14. So, I took 4 away, since 4 and 4 is eight. So, 4 students left the cafeteria.

2.OA.2 Add and subtract using numbers up to 20

Standard	Objective	Examples	
2.OA.2. Fluently add and subtract using numbers up to 20 using mental strategies. Know from memory all sums of two one-digit numbers.	Students will: • Demonstrate a mental math strategy that works best for them. • Know from memory all sums of two one-digit numbers	**Mental strategies from first grade 1.OA.6** • Counting on • Making ten (8 + 6 = 8 + 2 + 4 = 10 + 4 = 14) • Decomposing a number leading to a ten (13 - 4 = 13 - 3 - 1 = 10 - 1 = 9) • Using the relationship between addition and subtraction, such as fact families, (8 + 4 = 12 and 12 - 8 = 4) creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).	
		Developing Fluency for Addition & Subtraction within 20 **Example: 9 + 5= __**	
		Student A Counting On I started at 9 and then counted 5 more. I landed on 14.	**Student B** Decomposing a Number-Leading to a Ten I know that 9 and 1 is 10, so I broke 5 into 1 and 4. 9 plus 1 is 10. Then I have to add 4 more, which is 14.

<table>
<tr><td></td><td></td><td colspan="2">Example: 13 - 9 = __</td></tr>
<tr><td></td><td></td><td>Student A
Using the Relationship between Addition and Subtraction
I know that 9 plus 4 equals 13. So 13 minus 9 is 4.</td><td>Student B
Creating an Easier Problem
Instead of 13 minus 9, I added 1 to each of the numbers to make the problem 14 minus 10. I know the answer is 4. So 13 minus 9 is also 4.</td></tr>
<tr><td colspan="4">2.OA.3-4 Work with equal groups of objects to gain foundations for multiplication</td></tr>
<tr><td>Standard</td><td>Objective</td><td colspan="2">Examples</td></tr>
<tr><td rowspan="4">2.OA.3. Determine whether a group of objects (up to 20) is odd or even (e.g., by pairing objects and comparing, counting by 2s). Model an even number as two equal groups of objects and then write an equation as a sum of two equal addends.</td><td rowspan="4">Students will:
• Determine whether a group of objects is odd or even by pairing and comparing objects.
• Determine whether a group of objects is odd or even by counting by twos.
• Model an even number as two equal groups of objects.
• Write an equation as a sum of two equal addends (doubles) e.g. 3+3=6</td><td colspan="2">Is 8 an even number? Justify your thinking.</td></tr>
<tr><td>Student 1
I grabbed 8 counters. I paired counters up into groups of 2. Since I didn’t have any counters left over, I know that 8 is an even number.</td><td>Student 2
I grabbed 8 counters. I put them into 2 equal groups. There were 4 counters in each group, so 8 is an even number.</td></tr>
<tr><td>Student 3
I drew 8 boxes in a rectangle that had two columns. Since every box on the left matches a box on the right, I know that 8 is even.
  </td><td>Student 4
I drew 8 circles. I matched one on the left with one on the right. Since they all match up I know that 8 is an even number.
  </td></tr>
<tr><td colspan="2">Student 5
I know that 4 plus 4 equals 8. So 8 is an even number.</td></tr>
<tr><td rowspan="3">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 repeated addition (e.g., array of 4 by 5 would be 5 + 5 + 5 + 5 = 20).</td><td rowspan="3">Students will:
• Find the total number of objects in rectangular arrays with up to 5 rows and 5 columns.
• Write a repeated addition equation to represent the total number of objects in an array.</td><td colspan="2">What is the total number of circles below?
  </td></tr>
<tr><td>Student A
I see 3 counters in each column and there are 4 columns. So I added 3 + 3 + 3 + 3. That equals 12.</td><td>Student B
I see 4 counters in each row and there are 3 rows. So I added 4 + 4 + 4. That equals 12.</td></tr>
<tr><td>3 + 3 + 3 + 3 = 12</td><td>4 + 4 + 4 = 12</td></tr>
<tr><td colspan="4">2.OA.5 Identify and continue patterns</td></tr>
<tr><td>Standard</td><td>Objective</td><td colspan="2">Examples</td></tr>
<tr><td>2.OA.5. Identify, continue and label number patterns (e.g., aabb, abab). Describe a rule that determines and continues a sequence or pattern.</td><td>Students will:
• Identify number patterns.
• Continue number patterns.
• Label number patterns.
• Describe a rule that determines and continues a sequence or pattern.</td><td colspan="2">1. Is there a pattern in this number sequence?
2, 2, 4, 4, 2, 2, 4, 4
2. Continue the number patterns
3, 3, 2, 2, 3, 3, 2, 2, __, __
50, 40, 30 , __, __, __
3. Label the number patterns
2, 2, 4, 4, 2, 2, 4, 4
This is an aabb pattern
50, 40, 30 , __, __, __
The pattern is subtracting 10 each time.
4. Continue the pattern. What is the rule?
5,10,15,__, __, __Rule=+5</td></tr>
</table>

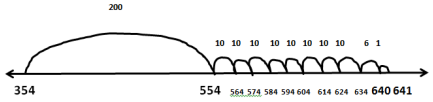
Number and Operations in Base Ten

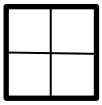
2.NBT.1-4 Understand place value

Standard	Objective	Examples
2.NBT.1. Model and identify place value positions of three-digit numbers. Include: a. 100 can be thought of as a bundle of ten tens --called a "hundred". b. b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).	Students will: • Model and identify place value positions of three-digit numbers. Include: a. 100 can be thought of as a bundle of ten tens -called a "hundred". b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).	**1.a. Example:** **Teacher**: I have a pile of base-ten rods. Count out 12 please. **Student**: Student gathers 12 ten-rods. **Teacher**: How many cubes do you think you have? **Student**: Makes an estimate. **Teacher**: Count them to see. **Student**: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120. There are 120 here. **Teacher**: So, do you think you have enough to make a 100? **Student**: Yes. **Teacher**: Go ahead and trade some in to make a 100. **Student**: Student trades 10 rods for a 100 flat and leaves 2 tens remaining. **Teacher**: What do you have now? **Student**: I have 1 hundred and 2 tens. **Teacher**: Does that help you know how many you have in all? **Student**: Yes. 1 hundred and 2 tens is 120. There are 120 cubes here in all. **1.b. Example:** Students can represent this with both groupable (cubes, links) and pre-grouped place value blocks) materials. **2.a.Example:** How many tens are in 120? **2.b.Example** How many hundreds are in the number 957?
2.NBT.2. Count up to 1000, skip-count by 5s, 10s and 100s.	Students will: • Orally count up to 1000 by 5s, 10s and 100s.	
2.NBT.3. Read, write, order up to 1000 using base-ten numerals, number names and expanded form.	Students will: • Read, write and order numbers up to 1000 using base-ten numerals, number names, and expanded form.	**1&2**. 1000 using base-ten numerals (236), number names (two hundred, thirty-six),expanded form (236=200+30+6) **3**. Put the following numbers in order from least to greatest: 21, 356, 12, 78, 780 12, 21, 78, 356, 780
2.NBT.4. Compare two three-digit numbers based on the meanings of the hundreds, tens and ones digits, using >, =, < symbols to record the results.	Students will: • Compare two three-digit numbers based on the meanings of the hundreds, tens and ones digits, using >, =, < symbols to record the results.	**Student A** **Place Value** 452 has 4 hundreds 5 tens and 2 ones. 455 has 4 hundreds 5 tens and 5 ones. They have the same number of hundreds and the same number of tens, but 455 has 5 ones and 452 only has 2 ones. 452 is less than 455. 452 < 455 **Student B** **Counting** 452 is less than 455. I know this because when I count up I say 452 before I say 455. 452 < 455 452 is less than 455

2.NBT.5-9 Use place value understanding and properties of operations to add and subtract

Standard	Objective	Examples
2.NBT.5. Fluently add and subtract using numbers up to 100. Use:	Students will: • Fluently add and subtract using numbers up to 100	**Example:** 67 + 25 = __

• Strategies based on place value • Properties of operations and/or the relationship between addition and subtraction.	using strategies based on place value. • Fluently add and subtract using numbers up to 100 using the properties of operations. • Fluently add and subtract using numbers up to 100 using the relationship between addition and subtraction.	**Place Value Strategy:** I broke both 67 and 25 into tens and ones. 6 tens plus 2 tens equals 8 tens. Then I added the ones. 7 ones plus 5 ones equals 12 ones. I then combined my tens and ones. 8 tens plus 12 ones equals 92.
		Decomposing into Tens: I decided to start with 67 and break 25 apart. I knew I needed 3 more to get to 70, so I broke off a 3 from the 25. I then added my 20 from the 22 left and got to 90. I had 2 left. 90 plus 2 is 92. So, 67 + 25 = 92
		Commutative Property: I broke 67 and 25 into tens and ones so I had to add 60+7+20+5. I added 60 and 20 first to get 80. Then I added 7 to get 87. Then I added 5 more. My answer is 92.
		Decomposing into Tens: I broke apart both 63 and 32 into tens and ones. I know that 3 minus 2 is 1, so I have 1 left in the ones place. I know that 6 tens minus 3 tens is 3 tens, so I have a 3 in my tens place. My answer has a 1 in the ones place and 3 in the tens place, so my answer is 31.
		Think Addition: I thought, '32 and what makes 63?'. I know that I needed 30, since 30 and 30 is 60. So, that got me to 62. I needed one more to get to 63. So, 30 and 1 is 31. 32 + 31 = 63
2.NBT.6. Add up to four two-digit numbers using strategies based on place value and properties of operations.	Students will: • Add up to four two-digit numbers using strategies based on place value. • Add up to four two-digit numbers using strategies-based properties of operations.	**Example:** 43 + 34 + 57 + 24 = __
		Associative Property I saw the 43 and 57 and added them first. I know 3 plus 7 equals 10, so when I added them 100 was my answer. Then I added 34 and had 134. Then I added 24 and had 158. 43 + 57 + 34 + 24 = 158
		Place Value Strategies I broke up all of the numbers into tens and ones. First, I added the tens. 40 + 30 + 50 + 20 = 140. Then I added the ones. 3 + 4 + 7 + 4 = 18. That meant I had 1 ten and 8 ones. So, 140 + 10 is 150. 150 and 8 more is 158. So, 43 + 34 + 57 + 24 = 158
		Place Value Strategies and Associative Property I broke up all the numbers into tens and ones. First, I added up the tens. 40 + 30 + 50 + 20. I changed the order of the numbers to make adding easier. I know that 30 plus 20 equals 50 and 50 more equals 100. Then I added the 40 and got 140. Then I added up the ones. 3 + 4 + 7 + 4. I changed the order of the numbers to make adding easier. I know that 3 plus 7 equals 10 and 4 plus 4 equals 8. 10 plus 8 equals 18. I then combined my tens and my ones. 140 plus 18 (1 ten and 8 ones) equals 158.
2.NBT.7. Add and subtract using numbers up to 1000. Use: • Concrete models or drawings and strategies based on place value	Students will: • Add and subtract using numbers up to 1000 using concrete models or drawings. • Add and subtract using numbers up to 1000 using strategies based on place value.	**Example:** 354 + 287 = __
		I started at 354 and jumped 200. I landed on 554. I then made 8 jumps of 10 and landed on 634. I then jumped 6 to land on 640. Then I jumped 1 more and landed on 641. 354 + 287 = 641 

		Example 5: How many different ways can you partition this rectangle into fourths? **Student A:** I partitioned the square into four equal sized squares. **Teacher:** How do you know that each section is a fourth? **Student A:** Because there are four equal sized squares. That means that each piece is a fourth of the whole square.  **Student B**: I partitioned the square in half down the middle. The section on the left I divided into two equal sized squares. The other section I partitioned into two equal sized triangles. **Teacher**: How do you know that each section is a fourth? **Student B**: Each section is a half of a half, which is the same as a fourth.