GRADE 2 MATHEMATICS

Overview:

Domains	Operations and Algebraic Thinking	Number & Operations in Base Ten	Measurement and Data	Geometry
Clusters	• Represent and solve problems involving addition and subtraction • Add and subtract within 20 • Work with equal groups of objects to gain foundations for multiplication	• Understand place value • Use place value and properties of operations to add and subtract	• Measure and estimate lengths in standard units • Relate addition and subtraction to length • Work with time and money • Represent and interpret data	• Reason with shapes and their attributes
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.
Major Interdisciplinary Grade 2Units	**English Language Arts: across the content areas** • Reading • Writing • Speaking & Listening • Language	**Indian Education for All Titles** • *Jingle Dancer* by Cynthia Leitich Smith • *Morning on the Lake* by Jan Waboose Bourdeau • *Range Eternal* by Louise Erdrich • *Red Parka Mary* by Peter Eyvindson	**Science** • States of Matter: Solids, Liquids, Gases • Life Cycles of Plants • Life Cycles of Animals	**Social Studies People Who Make a Difference:** • Parents, Grandparents, and Family Members • People Who Supply Our Needs • People from Many Cultures Now and Long Ago • Geographic Awareness

In Grade 2, instructional time should focus on four critical areas:

1. Extending understanding of base-ten notation

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. Building fluency with addition and subtraction

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.

1. **Using standard units of measure**
   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 iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.

2. **Describing and analyzing shapes**
   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 attributes of two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

Domain: Operations and Algebraic Thinking

2.OA

***Cluster:** Represent and solve problems involving addition and subtraction.*

1. Use addition and subtraction within 100 to solve one- and two-step word problems involving situations within a cultural context, including those of Montana American Indians, of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. *(Note: See Glossary, Table 1.)*
   (Whenever possible, use real world problems involving Montana American Indians)
   - I can use addition and subtraction within 100 to solve one- and two- step word problems to find an unknown number.
   - I can use drawings and equations to solve the unknown number in a problem.

***Cluster:** Add and subtract within 20.*

2. Fluently add and subtract within 20 using mental strategies. (*Note: Explanations may be supported by drawings or objects.)*
   By end of Grade 2, know from memory all sums of two one-digit numbers.
   - I can add and subtract within 20 using mental strategies.
   - I can know from memory the sum of two one-digit numbers.

***Cluster:** Work with equal groups of objects to gain foundations for multiplication.*

3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
   - I can determine if a group of objects (up to 20) is odd or even.
   - I can write an equation in which the sum is even using two equal addends.

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.
   - I can define the meaning of an array.
   - I can write an equation to represent the given array.

Domain: Number and Operations in Base Ten
2.NBT

***Cluster:** Understand place value.*

1. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
   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).
   - I can identify the place value of ones, tens, hundreds.
   - I can identify how many ones are in a ten.
   - I can identify how many tens are in a hundred.

2. Count within 1000; skip-count by 5s, 10s, and 100s.
   - I can count to 1000 by 5s, 10s, 100s.
   - I can skip count starting with various numbers within 100.

3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
   - I can read and write numbers to 1000 using base-ten numerals.
   - I can read and write number names to 1000.
   - I can show a number in expanded form to 1000.

4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
   - I can use >, <, and = to compare numbers

***Cluster:** Use place value understanding and properties of operations to add and subtract.*

5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
   - I can fluently add and subtract numbers to 100 without regrouping using various strategies.
   - I can fluently add and subtract numbers to 100 with regrouping using various strategies. .
   - I can show the relationship between addition and subtraction (note: subtraction is the inverse of addition).

6. Add up to four two-digit numbers using strategies based on place value and properties of operations.
   - I can add up to four two-digit numbers using various strategies.

7. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
   - I can add and subtract to 1000 using concrete models, drawings, and strategies based on place value.

- I can support my strategy through writing (note: journal, poster).

8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
   - I can mentally add 10 or 100 to a given number 100-900.
   - I can mentally subtract 10 or 100 from a given number 100-900.

9. Explain why addition and subtraction strategies work, using place value and the properties of operations. *(Note: Explanations may be supported by drawings or objects.)*
   - I can explain why addition and subtraction strategies work using a proof drawing.

Domain: Measurement and Data

2.MD

Cluster: Measure and estimate lengths in standard units.

1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
   - I can measure objects with appropriate tools.

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.
   - I can measure objects using two different units of measurement.
   - I can relate the two measurements.

3. Estimate lengths using units of inches, feet, centimeters, and meters.
   - I can estimate lengths of objects using inches, feet, centimeters, and meters.

4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
   - I can choose a measurement tool, compare two objects and determine the difference in their lengths.

Cluster: Relate addition and subtraction to length.

5. Use addition and subtraction within 100 to solve word problems within a cultural context, including those of Montana American Indians, involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
   (Whenever possible, use real world problems involving Montana American Indians)
   - I can use addition and subtraction to solve word problems involving length.
   - I can use drawings to solve word problems involving length.
   - I can use equations to solve for an unknown number.

6. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.
   - I can draw a number line and label whole numbers as lengths from 0-100.
   - I can find the sum or difference using my number line 0-100.

Cluster:** **Work with time and money.

7. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
   - I can tell time to the nearest 5 minutes using analog and digital clocks.
   - I can tell the difference between a.m. and p.m.
8. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. *Example: If you have 2 dimes and 3 pennies, how many cents do you have?*
   - I can solve word problems using dollar bills, quarters, dimes, nickels, and pennies.
   - I can use $ (dollar) and ¢ (cent) signs properly.

Cluster:** **Represent and interpret data.

9. Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
   - I can gather measurements to the nearest whole unit to create data.
   - I can make a horizontal scale using measurement data.

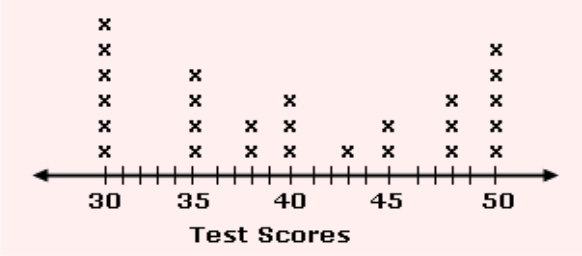
Line Plot

Definition of Line Plot

A line plot shows data on a number line with x or other marks to show frequency.

Examples of Line Plot

The line plot below shows the test scores of 26 students.



The count of cross marks above each score represents the number of students who obtained the respective score.

10. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set from a variety of cultural contexts, including those of Montana American Indians, with up to four categories. Solve simple put-together, take-apart, and compare problems. *(Note: See Glossary, Table 1)* using information presented in a bar graph.
    (Whenever possible use real world problems involving Montana American Indians.)
    - I can create a picture and bar graph to represent data.
    - I can use data from graphs to solve problems (note: addition, subtraction, equal to).

Domain: Geometry

2.G

Cluster: ***Reason with shapes and their attributes.***

1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. *(Note: See Glossary, Table 1)*
   Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
   - I can identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
   - I can draw and create shapes with a given number of angles and sides.

2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
   - I can divide a rectangle into rows and columns creating same size squares. This is called finding the area.
   - I can determine the area by counting the same size squares within a given rectangle.

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, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.
   - I can divide circles and rectangles into 2, 3, or 4 equal parts.
   - I can use words like half, halves, thirds, fourths.
   - I can show that equal parts of identical wholes may not have the same shape.

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[1] See Glossary, Table 1.
[2] See standard 1.OA.6 for a list of mental strategies.
[3] Explanations may be supported by drawings or objects
[4] See Glossary, Table 1

Standards	Explanations and Examples
Students are expected to:	**The Standards for Mathematical Practice describe ways in which students ought to engage with the subject matter as they grow in mathematical maturity and expertise.**
2.MP.1. Make sense of problems and persevere in solving them.	In second grade, students realize that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. They may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, "Does this make sense?" They make conjectures about the solution and plan out a problem-solving approach.
2.MP.2. Reason abstractly and quantitatively.	Younger students recognize that a number represents a specific quantity. They connect the quantity to written symbols. Quantitative reasoning entails creating a representation of a problem while attending to the meanings of the quantities. Second graders begin to know and use different properties of operations and relate addition and subtraction to length.
2.MP.3. Construct viable arguments and critique the reasoning of others.	Second graders may construct arguments using concrete referents, such as objects, pictures, drawings, and actions. They practice their mathematical communication skills as they participate in mathematical discussions involving questions like "How did you get that?", "Explain your thinking," and "Why is that true?" They not only explain their own thinking, but listen to others' explanations. They decide if the explanations make sense and ask appropriate questions.
2.MP.4. Model with	In early grades, students experiment with representing problem situations in multiple

mathematics.	ways including numbers, words (mathematical language), drawing pictures, using objects, acting out, making a chart or list, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed.
2.MP.5. Use appropriate tools strategically.	In second grade, students consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be better suited. For instance, second graders may decide to solve a problem by drawing a picture rather than writing an equation.
2.MP.6. Attend to precision.	As children begin to develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and when they explain their own reasoning.
2.MP.7. Look for and make use of structure.	Second graders look for patterns. For instance, they adopt mental math strategies based on patterns (making ten, fact families, doubles).
2.MP.8. Look for and express regularity in repeated reasoning.	Students notice repetitive actions in counting and computation, etc. When children have multiple opportunities to add and subtract, they look for shortcuts, such as rounding up and then adjusting the answer to compensate for the rounding. Students continually check their work by asking themselves, "Does this make sense?"

Standard	Grade 2 Montana Common Core Standards Vocabulary
2.OA.1	none
2.OA.2	none
2.OA.3	odd, even
2.OA.4	rectangular array, addends
2.NBT.1	place value
2.NBT.2	none
2.NBT.3	expanded form
2.NBT.4	>, <, =
2.NBT.5	place value, commutative property, associative property, identity property
2.NBT.6	place value, commutative property, associative property, identity property
2.NBT.7	place value, commutative property, associative property, identity property, compose, decompose
2.NBT.8	none
2.NBT.9	place value, commutative property, associative property, identity property
2.MD.1	length
2.MD.2	length, unit
2.MD.3	length, unit
2.MD.4	length, unit
2.MD.5	length, unit
2.MD.6	length, unit, number line diagram, sums, differences
2.MD.7	analog clock, digital clock, a.m., p.m.
2.MD.8	dollars ($), cents (¢), quarters, dimes, nickels, and pennies
2.MD.9	length, unit, line plot, scale
2.G.1	attribute, quadrilateral, rectangle, rhombus, square, parallelogram, trapezoid, kite
2.G.2	area, unit fraction