Grade 2 Unit 4: Measurement and Geometry

Content Area: **Math**
Course(s): **Math Grade 2**
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NJSLS Math

2.OA.A.1	Use addition and subtraction within 100 to solve one- and two-step word problems involving situations 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.
2.OA.B.2	With accuracy and efficiency, add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.
2.OA.C.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.
2.NBT.B.5	With accuracy and efficiency, add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
2.M.A.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2.M.A.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.
2.M.A.3	Estimate lengths using units of inches, feet, centimeters, and meters.
2.M.A.4	Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
2.M.B.5	Use addition and subtraction within 100 to solve word problems 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.
2.M.B.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.
2.DL.A.1	Understand that people collect data to answer questions. Understand that data can vary.
2.DL.A.2	Identify what could count as data (e.g., visuals, sounds, numbers).
2.DL.B.3	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.
2.DL.B.4	Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart, and compare problems using information presented in a bar graph.
2.G.A.1	Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
2.G.A.2	Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
2.G.A.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.

Unit Focus

- Measure and estimate lengths in standard units.
- Reason with shapes and their attributes.
- Relate addition and subtraction to length.
- Represent and interpret data.

Standards for Math Practice

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

Critical Knowledge & Skills

NJSLS Math	Suggested Math Practices	Critical Knowledge and Skills
2.M.A.3 (**M**) Estimate lengths using units of inches, feet, centimeters, and meters.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concepts: • Units of inches, feet, centimeters, and meters. Students will be able to: • Estimate lengths of objects. Learning Goal 1: • Estimate lengths of objects and measure lengths of objects using appropriate tools.

2.M.A.1 (**M**) Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concepts: • Measuring lengths using different tools Students will be able to: • Select the appropriate tool for measurement. • Measure lengths of objects using rules, yardsticks, meter sticks and measuring tapes. Learning Goal 2: • Measure the length of objects using rulers, yardsticks, meter sticks, and measuring tapes with increasing accuracy.
2.M.A.2 (**M**) 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.	MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concepts: • Relationship between the size of the unit chosen and the number of units needed for measurement. Students will be able to: • Measure the length of an object using different units of measure. • Compare the measurements and explain how they relate to each unit. Learning Goal 3: • Compare measurements of an object taken with two different units of measure and describe how the two measurements relate to the size of the unit chosen.

2.M.A.4 (**M**) Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): • Comparing lengths Students will be able to: • Measure objects, comparing to determine how much longer one object is than another. • Express the difference in length in terms of a standard unit of measure. Learning Goal 4: • Compare lengths of two objects and determine how much longer one object is than the other using a standard unit of measure.
2.M.B.5 (**M**) Use addition and subtraction within 100 to solve word problems 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.  Climate Change Example: Students may add and subtract within 100 to solve word problems about a climate change issue that involves length. To solve these problems, they may use drawings or equations to represent a climate change related issue in their school, such as food waste, recycling, reusing and/or reducing the consumption of goods.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	Concepts: • No new concept(s) introduced Students are able to: • Add and subtract, within 100, to solve word problems involving lengths (lengths are given in the same units). • Use drawings to represent the problem. • Use number sentences with a symbol for the unknown to represent the problem. Learning Goal 5: • Add and subtract within 100 to solve word problems involving lengths using a symbol to represent the unknown number.

2.G.A.1 (**A**) Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Clarification: sizes are compared directly or visually, not compared by measuring)	MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision. MP.8 Look for and express regularity in repeated reasoning.	Concepts: • Attributes of shapes (faces, angles) • Different types of shapes (triangles, quadrilaterals, pentagons, hexagons, cubes). Students will be able to: • Draw shapes having specified attributes (e.g. number of equal faces, number of angles). • Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. Learning Goal 6: • Draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
2.OA.B.2 (**M**) With accuracy and efficiency, add and subtract within 20 using mental strategies. By the end of Grade 2, know from memory all sums of two one-digit numbers.	MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure MP.8 Look for and express regularity in repeated reasoning.	Concepts: • No new concepts introduced. Students will be able to: • Add within 20 using mental strategies with accuracy and efficiency. • Subtract within 20 using mental strategies with accuracy and efficiency. Learning Goal 7: • Fluently add and subtract within 20 using mental strategies.

2.NBT.B.5 (**M**) With accuracy and efficiency, add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concepts: • No new concepts introduced Students will be able to: • With accuracy and efficiency, add and subtract within 100 using strategies based on place value. • With accuracy and efficiency, add and subtract within 100 using strategies based on properties of operations. • With accuracy and efficiency, add and subtract within 100 using strategies based on the relationship between addition and subtraction. Learning Goal 8: • Use a variety of strategies (place value, properties of operation, and/or the relationship between addition and subtraction) to add and subtract within 100.
2.G.A.2 (**A**) Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision. MP.8 Look for and express regularity in repeated reasoning.	Concepts: • Equal size squares. Students will be able to: • Partition a rectangle into rows and columns of same-size squares and count to find the total number. Learning Goal 9: • Partition a rectangle into rows and columns of same-size squares and count to

		find the total number.
2.OA.C.4 (**S**) 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.	MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concepts: • No new concepts introduced. Students will be able to: • With objects arranged in an array, use repeated addition to find the total. • With objects arranged in an array, write an equation to express repeated addition. Learning Goal 10: • 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.
2.G.A.3 (**A**) 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. For example, students partition a rectangle (i.e. the whole) into three equal shares, identify each of the shares as a 'third' and describe the rectangle as three 'thirds'.	MP.4 Model with mathematics. MP.7 Look for and make use of structure.	Concepts: • Equal shares of identical wholes need not have the same shape. • Fractions like half, thirds, fourths. Students will be able to: • Partition rectangles into two, three, or four equal shares. • Partition two same-sized rectangles to show that equal shares of identical wholes need not have the same shape. • Describe the shares using the words halves, thirds,

		fourths, half of, a third of, a fourth of, etc. • Recognize and then describe the whole as two halves, three thirds, four fourths. Learning Goal 11: • 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, and four fourths.
2.OA.A.1 (**M**) Use addition and subtraction within 100 to solve one- and two-step word problems involving situations 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.  Climate Change Example: Students may solve two-step word problems involving a climate change related issue in their school, such as food waste, recycling, reusing and/or reducing the consumption of goods. They may add and subtract within 100 while using drawing or equations to represent the climate change related issue.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.8 Look for and express regularity in repeated reasoning.	Concepts: • No new concepts introduced Students will be able to: • Count on and put together to add to solve one- and two-step word problems. • Take from or take apart to subtract to solve one- and two-step word problems. • Use drawings and equations to represent the problem. Learning Goal 12: • Add and subtract within 100 to solve 1- and 2-step word problems with unknowns in any position.
2.M.B.6 (**M**) Represent whole numbers as lengths from 0 on a	MP.4 Model with mathematics.	Concepts:

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.	MP 2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically.	• Representing numbers on a number line. • Addition and subtraction on a number line. Students will be able to: • Use equally spaced points of a number line to represent whole numbers as lengths from 0. • Represent whole number sums within 100 on a number line diagram. • Represent whole number differences within 100 on a number line diagram. Learning Goal 13: • Use a number line to represent the solution of whole number sums and differences related to length within 100.
2.DL.B.3 (**S**) 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.	MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.8 Look for and express regularity in repeated reasoning.	Concepts: • Accuracy in measurement. • Organizing data visually. Students are able to: • Generate measurement data by measuring lengths, to the nearest whole unit, of several objects or by making repeated measurements of the same object. • Record the measurements in a line plot having a horizontal scale in whole number units. Learning Goal 14:

		• Use tools of measurement to measure lengths of several objects to the nearest whole unit and represent the data on a line plot with appropriate whole number units on the horizontal scale.
2.DL.B.4 (S) Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart, and compare problems using information presented in a bar graph.  Climate Change Example: Students may draw a bar graph having a single-unit scale to represent a data set about a climate change related issue in their school, such as food waste, recycling, reusing and/or reducing the consumption of goods.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.8 Look for and express regularity in repeated reasoning.	Concepts: • Using graphical information for comparisons. • Solving problems based on information presented graphically. Students will be able to: • Draw a picture graph to represent a data set with up to four categories. • Draw a bar graph to represent a data set with up to four categories. • Use information in a bar graph to solve simple put together, take apart, and compare problems. Learning Goal 15: • Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in the graph.
2.DL.A.1 (A) Understand that people collect data to answer questions. Understand that data can vary.	MP.2 Reason abstractly and quantitatively.	Concepts: • Data can be used to answer questions.

	MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.8 Look for and express regularity in repeated reasoning.	• Data can vary. Students will be able to: • Identify reasons for collecting data to find answers. • Explain that data can be different in various ways. • Recognize different types of data collection methods. Learning Goal 16: • Identify reasons for data collection, explain data differences, and recognize various data collection methods.
2.DL.A.2 (**A**) Identify what could count as data (e.g., visuals, sounds, numbers).	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.8 Look for and express regularity in repeated reasoning.	Concepts: • Different forms of data. Students will be able to: • Identify different forms of data. Learning Goal 17: • Recognize and categorize visuals, sounds, and numbers as forms of data.

School/District Formative Assessment Plan

- Topic 12-1 through 12-9 Quick Check (found in Savvas Realize)

- Topic 13-1 through 13-8 Quick Check (found in Savvas Realize)
- Topic 14-1 through 14-5 Quick Check (found in Savvas Realize)
- Topic 15-1 through 15-5 Quick Check (found in Savvas Realize)

School/District Summative Assessment Plan

- Topic 12 Assessment
- Topic 13 Assessment
- Topic 14 Assessment
- Topic 15 Assessment

Benchmark & Alternative Assessments

- STAR Renaissance
- Performance Tasks (found in Savvas Realize)

Focus Mathematical Concepts

Pre-requisite skills

- The length of an object is the number of same-size length units that span it with no gaps or overlaps (1.M.A.2).
- Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object end to end (1.M.A.2).
- Compose tens when adding two-digit numbers, if necessary (1.NBT.C.4).
- When adding two-digit numbers, one adds tens and tens, ones and ones (1.NBT.C.4).
- Add a two-digit number and a one-digit number within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction (1.NBT.C.4).
- Add a two-digit number and a multiple of 10, within 100, using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction (1.NBT.C.4).
- Subtract multiples of 10 from multiples of 10 using strategies based on place value or properties of

operations (multiples of 10 less than or equal to 90) (1.NBT.C.6).

- Explain the reasoning used when subtracting multiples of 10 from multiples of 10 (multiples of 10 less than or equal to 90) (1.NBT.C.6).
- Distinguish between defining and non defining attributes (1.G.A.1).
- Build and draw shapes that have particular defining attributes (1.G.A.1).
- Partition means to split a shape into smaller parts, also called shares (1.G.A.3).
- Decomposing shapes into more equal shares creates smaller shares (1.G.A.3).
- Partition circles and rectangles into two equal shares and describe each share using the word “halves” or the phrase “half of” (1.G.A.3).
- Partition circles and rectangles into four equal shares and describe each share using the word “fourths” or the phrase “fourth of” (1.G.A.3).
- Determine if equations involving addition and subtraction within 20 are true or false using the meaning of the equal sign (1.OA.D.7).
- Represent a word problem using objects, drawings, or equations using a symbol for the unknown (1.OA.A.1).
- Solve addition and subtraction word problems within 20 involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions (1.OA.A.1).

Common Misconceptions

- Students may think that the 4 in 464 represents 4, not 400 or the 6 in 464 represents 6 not 60.
- Students need many experiences representing three digit numbers with manipulatives that group (base ten blocks) and those that do not group, such as counters, etc.
- Students will not divide shapes into equal shares to show halves, thirds, or fourths.

Number Fluency

- 2.OA.B.2 Add and subtract within 20 using mental strategies; Know single digit sums from memory.
- 2.NBT.B.5 Add and subtract within 100.

District/School Tasks

- Pick A Project (found in Savvas Realize)

- Performance Tasks (found in Savvas Realize)

District/School Primary, Supplemental, & Intervention Resources

- Envisions by Savvas
- STAR Renaissance
- Freckle Math
- Connecting Math Concepts
- Corrective Math

Instructional Best Practices/Open Educational Resources

Illustrative Mathematics

Desmos

Numeracy Tasks

Building Thinking Classrooms Tasks

Open Middle Math Tasks

Resources from Dr. Eric Milou

Career Readiness, Life Literacies, and Key Skills

9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.
9.1.2.CR.1	Recognize ways to volunteer in the classroom, school and community.
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
9.4.2.IML.2	Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).

Computer Science and Design Thinking

8.1.2.DA.1	Collect and present data, including climate change data, in various visual formats.
8.1.2.DA.2	Store, copy, search, retrieve, modify, and delete data using a computing device.
8.1.2.DA.3	Identify and describe patterns in data visualizations.
8.1.2.DA.4	Make predictions based on data using charts or graphs.

Interdisciplinary Connections

2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
2-PS1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.
2-LS2-2	Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.
2-LS4-1	Make observations of plants and animals to compare the diversity of life in different habitats.
RI.CR.2.1	Ask and answer questions to demonstrate understanding of key details in an informational text, referring explicitly to the text as the basis for the answers.
RI.IT.2.3	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in a sequence within a text.
RI.AA.2.7	Describe and identify the logical connections of how reasons support specific points the author makes in a text.
2-ESS2-1	Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
W.WR.2.5	Generate questions about a topic and locate related information from a reference source to obtain information on that topic through shared and independent research.
W.SE.2.6	Prioritize information provided by different sources on the same topic while gathering ideas and planning to write about a topic.
SL.UM.2.5	Use multimedia; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.