Grade 3 Unit 4: Measurement and Geometry

Content Area: **Math**
Course(s): **Math Grade 3**
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NJSLS Math

MATH.3.OA.A.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
MATH.3.OA.C.7	With accuracy and efficiency, multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
MATH.3.OA.D.8	Solve two-step word problems, including problems involving money, using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
MATH.3.NBT.A.2	With accuracy and efficiency, add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
MATH.3.NF.A.1	Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$.
MATH.3.M.A.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
MATH.3.M.A.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.
MATH.3.M.B.3.b	A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.
MATH.3.M.B.5.b	Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
MATH.3.M.C.6	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
MATH.3.G.A.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
MATH.3.G.A.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.

Unit Focus

- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- Reason with shapes and their attributes.
- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

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
3.M.A.1 (**M**) Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	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: • Analog clocks represent hours as numbers and minutes are represented as tick marks. Students will be able to: • Tell time to the nearest minute using digital and analog clocks. • Write time to the nearest minute using analog clocks. • Choose appropriate strategies to solve real world problems involving

		time. • Use the number line as a visual model to determine intervals of time as jumps on a number line. • Measure time intervals. Learning Goal 1: • Tell and write time to the nearest minute, and solve word problems with addition and subtraction involving time intervals in minutes.
3.NBT.A.2 (A) With accuracy and efficiency, add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	MP.2 Reason abstractly and quantitatively.	Concepts: • No new concepts introduced Students will be able to: • Add and subtract two 2-digit whole numbers within 1000 with accuracy and efficiency. Learning Goal 2: • Fluently add and subtract (with regrouping) two 2-digit whole numbers within 1000.
3.M.A.2 (M) Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (Clarification: "Measure and estimate liquid volumes and masses" excludes	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	Concepts: • Mass may be measured in grams and kilograms. • Mass is measured by weighing. • Volume may be measured in liters. • Volume may be measured with instruments such as

compound units such as cm^3 and finding the geometric volume of a container. "Multiplying to solve one-step word problems" excludes multiplicative comparison problems (problems involving "times as much").	strategically. MP.6 Attend to precision.	beakers. Students will be able to: • Measure and estimate liquid volumes, using standard units accurately. • Measure and estimate mass, using standard units accurately. • Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes. Learning Goal 3: • Solve one step word problems by estimating and measuring volume and mass using appropriate tools and standard units of grams, kilograms, and liters.
3.OA.A.3 (**M**) Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. Climate Change Example: Students may solve multiplication and division word problems involving measurement quantities related to glacier retreat.	MP.1 Make sense of problems and persevere in solving them. MP.4 Model with mathematics.	Concepts: • No new concepts introduced Students will be able to: • Multiply to solve word problems involving equal groups and arrays. • Divide to solve word problems involving equal groups and arrays. • Represent a word problem with a drawing showing equal groups, arrays, equal shares, and/or total objects. • Represent a word problem with an equation. Learning Goal 4:

		• Use multiplication and division within 100 to solve word problems by modeling equal groups or arrays and by writing equations to represent equal groups or arrays.
3.OA.C.7 (**M**) With accuracy and efficiency, multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products 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 concept) introduced Students will be able to: • Multiply and divide within 100 with accuracy and efficiency. Learning Goal 3: • Fluently multiply and divide within 100 using strategies such as the relationship between multiplication and division.
3.G.A.1 (**S**) Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concepts: • Shapes in different categories share attributes. • Quadrilaterals are closed figures with four sides. • Rhombuses, rectangles, etc, and other quadrilaterals share attributes. Students will be able to: • Classify and sort shapes by their attributes. • Explain why rhombuses, rectangles, and squares are examples of quadrilaterals. • Draw examples of

		quadrilaterals. Learning Goal 4: • Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
3.NF.A.1 (**M**) Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b. For example: If a rectangle (i.e. the whole) is partitioned into 3 equal parts, each part is 1/3. Two of those parts would be 2/3.	MP.2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concepts: • No new concepts introduced. Students will be able to: • Partition rectangles, and other shapes, into halves, thirds, fourths, sixths and eighths. • Identify the fractional name of each part. • Model and explain that a fraction a/b as the quantity formed by a parts of size 1/b (e.g. 10/2 is 10 parts and each part is of size 1/2). Learning Goal 5: • Demonstrate how a fraction a/b represents a quantity formed by a parts, each of size 1/b.
3.G.A.2 (**S**) Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.	MP.2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically.	Concepts: • A unit fraction represents one part of a whole that has been divided into equal parts. Students will be able to: • Partition shapes into equal

	MP.6 Attend to precision. MP.7 Look for and make use of structure.	areas. • Express the area of each part as a unit fraction of the whole shape. Learning Goal 6: • Partition shapes into equal parts and express the area of each part as a unit fraction of the whole shape (e.g.,1/2,1/3, 1/4, etc.).
3.M.B.3b (**M**) Recognize area as an attribute of plane figures and understand concepts of area measurement. b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.7 Look for and make use of structure.	Concepts: • No new concepts introduced. Students will be able to: • Define a unit square and its purpose in measuring area. • Apply the concept of unit squares to calculate the area of simple plane figures. Learning Goal 7: • Apply the concept of unit squares to calculate the area of simple plane figures.
3.M.C.6 (**A**) Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.  Climate Change Example: Students may solve real world problems about glacier retreat that	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: • Perimeter of a figure is equivalent to the sum of the length of all of the sides. • Rectangles that have the same perimeter can have different areas. • Rectangles that have the same area can have different perimeters.

involve perimeters of polygons.		Students will be able to: • Determine the perimeter of various plane shapes and irregular shapes given the side lengths. • Determine the unknown side length given the perimeter and other sides. • Show rectangles having the same perimeter and different areas. • Show rectangles having different perimeters and the same area. Learning Goal 8: • Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
3.OA.D.8 (**M**) Solve two-step word problems, including problems involving money, using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (Clarification: This standard is limited to problems posed with whole numbers and having whole number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify	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	Concepts: • Letters or symbols in an equation represent an unknown quantity. Students are able to: • Represent the solution to two-step word problems with equations. • Use a symbol to represent an unknown in an equation. • Use rounding as an estimation strategy.

a particular order) (Order of Operations)  Climate Change Example: Students may use the four operations to solve two-step word problems related to glacier retreat.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	• Explain, using an estimation strategy, whether an answer is reasonable. Learning Goal 9: • Write equations when solving two-step word problems, using a symbol for an unknown; find the value of an unknown in an equation involving any of the four operations and use estimation strategies to assess the reasonableness of answers.
3.M.B.5b (**M**) Relate area to the operations of multiplication and addition. b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.	MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	Concepts: • No new concepts introduced. Students will be able to: • Tile a rectangle with unit squares. • Multiply side lengths of a rectangle to find its area and compare the result to that found by tiling the rectangle with unit squares. Learning Goal 10: • Tile a rectangle to find its area and explain the relationship between tiling and multiplying side lengths to find the area of rectangles; solve real world problems by multiplying side lengths to find areas of rectangles.

- Topics 14-1 through 14-9 Quick Check (found in Savvas Realize).
- Topics 15-1 through 15-4 Quick Check (found in Savvas Realize).
- Topics 16-1 through 16-6 Quick Check (found in Savvas Realize).

School/District Summative Assessment Plan

- Topic 14 Assessment
- Topic 15 Assessment
- Topic 16 Assessment

Focus Mathematical Concepts

Pre-requisite skills

- Use concrete models and a place value strategy to add and subtract within 1000, and relate the written strategy to the model (2.NBT.B.7).
- Use drawings and a place value strategy to add and subtract within 1000, and relate the written strategy to the drawing (2.NBT.B.7).
- Use concrete models and a strategy based on properties of operations and/or the relationship between addition and subtraction to add and subtract within 1000, and relate the written strategy to the model (2.NBT.B.7).
- Use drawings and a strategy based on properties of operations and/or the relationship between addition and subtraction to add and subtract within 1000, and relate the written strategy to the drawing (2.NBT.B.7).
- Add and subtract within 100 to solve word problems that involve lengths of the same units (2.M.B.5).
- Use equations with a symbol for the unknown and drawings, such as drawings of rulers, to represent the problem (2.M.B.5).
- Use repeated addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns (2.OA.C.4).
- Write an equation to express the total number of objects arranged in a rectangular array as a sum of equal addends (2.OA.C.4).
- Recognize and draw shapes based on their attributes, such as a given number of angles or a given number of equal faces (2.G.A.1).

- Identify cubes, triangles, quadrilaterals, pentagons, and hexagons (2.G.A.1).
- Partition circles and rectangles into two, three, or four equal shares (2.G.A.3).
- Describe the shares using the words halves, thirds, fourths, half of, a third of, or fourth of (2.G.A.3).
- Describe the whole as two halves, three thirds, four fourths (2.G.A.3).
- Recognize that equal shares of identical wholes need not have the same shape (2.G.A.3).
- Measure lengths of objects after selecting appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes (2.M.A.1).
- Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter circles) to create a composite shape (1.G.A.2).
- Represent a word problem using drawings and equations using a symbol for the unknown (2.OA.A.1).
- Solve one and two-step addition and subtraction word problems within 100 involving situations of adding to, taking from, putting together, taking apart, and comparing (2.OA.A.1).

Common Misconceptions

- Students may read the mark on a scale that is below a designated number on the scale as if it was the next number. For example, a mark that is one mark below 80 grams may be read as 81 grams. Students realize it is one away from 80, but do not think of it as 79 grams.

Number Fluency

- 3.OA.C.7 Multiply and divide within 100; Know single digit products from memory.
- 3.NBT.A.2 Add and subtract within 1000.

District/School Tasks

- Pick A Project (found in Savvas Realize)
- Performance Tasks (found in Savvas Realize)

District/School Primary and Supplementary Resources

- Envisions by Savvas

- STAR Renaissance

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 Awareness, Exploration, Preparation, and Training

WRK.9.2.5.CAP.4	Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.

Life Literacies & Key Skills

TECH.9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
TECH.9.4.5.CT.3	Describe how digital tools and technology may be used to solve problems.
TECH.9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
TECH.9.4.5.TL.2	Sort and filter data in a spreadsheet to analyze findings.
TECH.9.4.5.IML.2	Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3).
TECH.9.4.5.IML.3	Represent the same data in multiple visual formats in order to tell a story about the data.

Interdisciplinary Connections

SCI.3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
ELA.RI.CR.3.1	Ask and answer questions and make relevant connections to demonstrate understanding of an informational text, referring explicitly to textual evidence as the basis for the answers.
ELA.W.WR.3.5	Generate questions about a topic and independently locate related information from at least two reference sources (print and non-print) to obtain information on that topic.
ELA.W.SE.3.6	Use discussion, books, or media resources to gather ideas, outline them, and prioritize the information to include while planning to write about a topic.
SCI.3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.