Unit 3: Data and Measurement

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

MATH.5.M.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
MATH.5.M.B.2	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
MATH.5.M.B.2.a	A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.
MATH.5.M.B.2.b	A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.
MATH.5.M.B.3	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
MATH.5.M.B.4	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
MATH.5.M.B.4.a	Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
MATH.5.M.B.4.b	Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.
MATH.5.M.B.4.c	Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.
MATH.5.DL.A.1	Understand how different visualizations can highlight different aspects of data. Ask questions and interpret data visualizations to describe and analyze patterns.
MATH.5.DL.A.2	Develop strategies to collect, organize and represent data of various types and from various sources. Communicate results digitally through a data visual (e.g., chart, storyboard, video presentation).
MATH.5.DL.A.3	Collect and clean data to be analyzable (e.g., make sure each entry is formatted correctly, deal with missing or incomplete data).
MATH.5.DL.A.4	Using appropriate visualizations (i.e., double line plot, double bar graph), analyze data across samples.
MATH.5.DL.B.5	Make a line plot to display a data set of measurements in fractions of a unit (½, ¼, ⅛). Use operations on fractions for this grade to solve problems involving information presented in line plots.

Unit Focus

- Represent and interpret data
- Understand concepts of volume
- Convert like measurement units within a given measurement system

Standards for Math Practice

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

Critical Knowledge & Skills

NJSLS Math	Suggested Math Practices	Critical Knowledge and Skills
5.DL.A.1 (A) Understand how different visualizations can highlight different aspects of data. Ask questions and interpret data visualizations to describe and analyze patterns.	MP.4 Model with mathematics.	Concept(s): • Choice of visualization affects what the viewer notices. • Describing trends, outliers, and patterns using evidence from the visual representation. Students will be able to: • Identify and describe different types of data visualizations. • Compare how the same data can be represented in multiple visual formats. • Interpret data from visualizations.

		• Ask meaningful questions based on a given data visualization. • Analyze patterns in data visualizations Learning Goal 1: Explain that different types of data visualizations (such as bar graphs, line graphs, and pie charts) can emphasize different aspects of the same data, and ask questions, interpret the visual information, and analyze patterns to draw meaningful conclusions.
5.DL.A.2 (A) Develop strategies to collect, organize and represent data of various types and from various sources. Communicate results digitally through a data visual (e.g. chart, storyboard, video presentation).	MP.4 Model with mathematics.	Concept(s): • Planning how to collect data and what data to collect. • Sorting and classifying data for clarity and usefulness. • Different visuals suit different types of data and purposes. • Digital and visual communication skills. Students will be able to: • Develop a strategy to collect data from multiple sources, including surveys, observations, or digital tools. • Organize collected data into clear categories or formats using tables, charts, or spreadsheets. • Represent data visually using appropriate formats such as bar graphs, pie charts, storyboards, or

		timelines. • Create a digital data visual. Learning Goal 2: Develop and apply strategies to collect, organize, and represent data from various sources and of different types, and effectively communicate findings through a digital data visual such as a chart, storyboard, or video presentation.
5.DL.A.3 (A) Collect and clean data to be analyzable (e.g., make sure each entry is formatted correctly, deal with missing or incomplete data).	MP.4 Model with mathematics.	Concept(s): • Standardizing formats (e.g., dates written consistently, capitalization, units). • Dealing with missing or incomplete data by: removing irrelevant entries, filling in missing information (when possible), and noting gaps for future analysis. • Clean data is necessary for accurate analysis and interpretation. Students will be able to: • Identify errors or inconsistencies in a data set, such as incorrect formats, duplicate entries, or typos. • Detect missing or incomplete data and determine appropriate ways to address it. • Prepare a cleaned dataset that is ready for analysis and visualization. Learning Goal 3: Collect data accurately and clean it by identifying and correcting errors,

		standardizing formatting, and addressing missing or incomplete information to ensure the data is ready for analysis.
5.DL.A.4 (A) Using appropriate visualizations (i.e. double line plot, double bar graph), analyze data across samples.	MP.4 Model with mathematics.	Concept(s): • Select and use the correct type of visualization for comparing two related datasets or samples. • Analyzing similarities, differences, and patterns between the two datasets. Students will be able to: • Identify and explain the purpose of double line plots and double bar graphs for comparing two data sets. • Select an appropriate type of visualization based on the data and the question being asked. • Construct double line plots and double bar graphs to represent two related sets of data. • Interpret information from a double line plot or double bar graph to describe relationships, trends, and differences between two samples. Learning Goal 4: Select and use appropriate visualizations, such as double line plots and double bar graphs, to compare and analyze data across two samples, and draw conclusions based on patterns and differences observed in the data.
5.DL.B.5 (S) Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8).	MP.1 Make sense of problems and persevere in solving them.	Concept(s): • No new concept(s)

Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	introduced Students are able to: • Use measurement information to create a line plot. • Using measurement information presented in line plots, add, subtract, multiply and divide fractions in order to solve problems. Learning Goal 5: Make a line plot to display a data set in measurements in fractions of a unit (1/2, 1/4, 1/8) and use it to solve problems involving the four operations on fractions with unlike denominators.
5.M.B.2a-b (M) Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.	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.7 Look for and make use of structure.	Concept(s): • Volume is the amount of space inside a solid (3-dimensional) figure. • Cubes with side length of 1 unit, called "a unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. • Solid figures which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units. • Volume of a solid can be determined using unit cubes of other dimensions. Students will be able to: • Count unit cubes in order to measure the volume of a solid.

		• Use unit cubes of centimeters, inches, and/or other units to measure volume. Learning Goal 6: Measure volume by counting the total number cubic units required to fill a figure without gaps or overlaps
5.M.B.3 (M) Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.	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.7 Look for and make use of structure.	Concept(s): • No new concepts introduced. Students will be able to: • Measure volumes by counting unit cubes, using cubic cm, cubic in., cubic ft., and non-standard units. Learning Goal 7: Measure volumes by counting unit cubes, using cubic cm, cubic in., cubic ft., and non-standard units.
5.M.B.4a-c (M) Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold	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.	Concept(s): • Volume is additive: volumes of composite solids can be determined by adding the volumes of each solid. Students will be able to: • Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by

whole-number products as volumes, e.g., to represent the associative property of multiplication. b. Apply the formulas V = l x w x h and V = B x h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems. c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	multiplying the edge lengths. • Represent volumes as the product of three whole numbers. • Apply the formulas V = l x w x h and V = B x h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems. • Recognize volume as additive and find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding • the volumes of the non-overlapping parts, applying this technique to solve real world problems. Learning Goal 8: Show that the volume of a right rectangular prism found by counting all the unit cubes is the same as the formulas V = l x w x h or V = B x h. Learning Goal 9: Apply formulas to solve real world and mathematical problems involving volumes of right rectangular prisms that have whole number edge lengths. Learning Goal 10: Find the volume of a composite solid figure composed of two non-overlapping

		right rectangular prisms, applying this strategy to solve real-world problems.
5.M.A.1 (S) Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): • Measurement units can be converted within a given measurement system. Students will be able to: • Convert from one measurement unit to another within a given measurement system (e.g., convert 5 cm to 0.05 m, convert minutes to hours). • Solve multi-step, real world problems that require conversions. Learning Goal 11: Convert standard measurement units within the same system (e.g., centimeters to meters) in order to solve multi-step problems.

School/District Formative Assessment Plan

- Topic 10-1 through 10-4 Quick Check (found in Savvas Realize)
- Topic 11-1 through 11-5 Quick Check (found in Savvas Realize)
- Topic 12-1 through 12-9 Quick Check (found in Savvas Realize)

School/District Summative Assessment Plan

- Topic 10 Assessment
- Topic 11 Assessment
- Topic 12 Assessment

Benchmark & Alternative Assessments

- STAR Renaissance
- LinkIt Benchmarks
- Performance Task (found in Savvas Realize)

Focus Mathematical Concepts

Pre-requisite skills:

- Make a line plot to display a data set of measurements using unit fractions (1/2, 1/4, 1/8) (4.DL.B.5).
- Use data presented in line plots to solve problems involving addition and subtraction of fractions (4.DL.B.5).
- A square with side length 1 unit, called “a unit square,” is said to have one square unit of area (3.M.B.3).
- A unit square can be used to measure area area as an attribute of a plane figure (3.M.B.3).
- The number of n square units covering a plane figure without gaps or overlaps, determines its area (3.M.B.3).
- Measure area by counting unit squares including square cm, square m, square in, square ft, and nonstandard units (3.M.B.4).
- Find the area of a rectangle with whole number side lengths by tiling it (3.M.B.5).
- Apply properties of operations (associative property) as strategies to multiply (3.OA.B.5).
- Apply the area formula for rectangles in real world and mathematical problems (4.M.A.3).
- Apply perimeter formulas for rectangles in real world and mathematical problems (4.M.A.3).
- Multiply side lengths of rectangles to find areas in the context of real world and mathematical problems (3.M.B.5).
- Represent whole-number products as rectangular areas (3.M.B.5).
- Recognize area as additive by finding areas of rectangles (3.M.B.5).
- Recognize area as additive by finding areas of rectilinear figures (3.M.B.5).
- Decompose rectilinear figures into nonoverlapping rectangles and find their areas to solve real world

problems (3.M.B.5).

Common Misconceptions:

- Students may interchange volume, area, and perimeter.

Number Fluency:

- 5.NBT.B.5 Multiply multi-digit whole numbers using the standard algorithm.

District/School Tasks

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

District/School Primary, Supplemental, and Intervention Resources

- Envisions by Savvas (P)
- STAR Renaissance (S)
- Freckle Math (S)
- Connecting Math Concepts (I)
- Corrective Math (I)

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 & Key Skills

PFL.9.1.5.CR.1	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
WRK.9.2.5.CAP.3	Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
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.
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.

Computer Science & Design Thinking

CS.3-5.8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
CS.3-5.8.1.5.DA.2	Compare the amount of storage space required for different types of data.
CS.3-5.8.1.5.DA.3	Organize and present collected data visually to communicate insights gained from different views of the data.
CS.3-5.8.1.5.DA.4	Organize and present climate change data visually to highlight relationships or support a claim.
CS.3-5.8.1.5.DA.5	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Interdisciplinary Connections

SCI.5-PS1-1	Develop a model to describe that matter is made of particles too small to be seen.
ELA.RI.CR.5.1	Quote accurately from an informational text when explaining what the text says explicitly and make relevant connections when drawing inferences from the text.
ELA.RI.MF.5.6	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears.
ELA.RI.CT.5.8	Compare and contrast the authors' approaches across two or more informational texts

	within the same genre or about texts on the same or similar topics.
ELA.W.AW.5.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
ELA.W.AW.5.1.A	Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer's purpose.
ELA.W.AW.5.1.B	Provide logically ordered reasons that are supported by facts and details from text(s), quote directly from text when appropriate.
ELA.W.AW.5.1.C	Link opinion and reasons using words, phrases, and clauses (e.g., consequently, specifically).
ELA.W.AW.5.1.D	Provide a conclusion related to the opinion presented.
SCI.5-LS1-1	Support an argument that plants get the materials they need for growth chiefly from air and water.