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New Mexico Instructional Scope

5th Grade Measurement and Data Guide

The purpose of this tool is to help educators understand each of the grade level standards and how those standards connect to the students' overall preparation for college and career readiness.

The NMIS is a teacher-influenced tool, designed to provide instructional planning support at the programmatic level for districts and instructional level for teachers. Its foundation stems from the vision and mission of the PED and came into existence to assure that students in NM will be engaged in a culturally and linguistically responsive educational system that meets the social, emotional, and academic needs of ALL students. This is also rooted in the belief that all students must have access to on-grade-level standards, focusing on acceleration. The purpose of this tool is to help educators understand each of the grade level standards and how those standards connect to the students' overall preparation for college and career readiness.

Standards are defined as the most critical prerequisite skills and knowledge. This document is color-coded to reflect both anchor and priority standards. Though previous emphasis was placed on priority standards to address lost learning due to COVID-19, New Mexico teachers should note that moving forward, while priority standards allow for acceleration of learning, all standards should be addressed in instruction throughout the school year.

In this guide you will find:

- A breakdown of each of the grade level standards within the cluster, including:
  - Standards of Mathematical Practice
  - Common Misconceptions
  - Identification of Priority Standards, as identified by NMPED.
  - Level of Rigor Identification
- Sample aligned assessment items
- Suggested Student Discourse Guide
- A multilayered system of supports (MLSS) and culturally and linguistically responsive instruction (CLR) guide

NEW MEXICO
Public Education Department

New Mexico Instructional Scope

5th Grade Measurement and Data Guide

Key		
	Priority Standard	Priority standards, as identified by NMPED, are denoted with red highlighting. Priority standards are the most critical prerequisite skills and knowledge a student needs. This does not mean that these are only standards required to be taught, just these are the standards that will allow for the acceleration the students of New Mexico need during this time.
	*Conceptual Understanding*	Conceptual Understanding standards help students build a deep understanding of the **how** and **why** of mathematics.
	*Application*	Application standards help students identify the appropriate concepts and skills to tackle **novel real-world problems.**
	*Procedural Skill and Fluency*	Procedural standards help students develop **efficiency** and **accuracy** in computations.

Standards Breakdown

- Convert like measurement units within a given measurement system
  - 5.MD.A.1
- Represent and interpret data
  - 5.MD.B.2
- Geometric measurement: understand concepts of volume
  - 5.MD.C.3
  - 5.MD.C.4
  - 5.MD.C.5

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
5th Grade Measurement and Data Guide

Grade	*CCSS Domain*	*CCSS Cluster*
5	**Measurement and Data**	**Convert like measurement units within a given measurement system**

Cluster Standard: 5.MD.A.1

Standard	Standards for Mathematical Practice
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.	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 2:** Reason abstractly and quantitatively. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• In Grade 5, students extend their abilities from Grade 4 (4.MD.A.1) to express measurements in larger or smaller units within a measurement system. This is an excellent opportunity to reinforce notions of place value for whole numbers and decimals, and make connections between fractions and decimals (e.g., 2 1/2 meters can be expressed as 2.5 meters or 250 centimeters).	• Recognize units of measurement within the same system. • Convert units of measurement within the same system by multiplying or dividing. • Solve multi-step, real world problems that involve converting units
DOK	**Blooms**
1-2	Remember, Understand, Apply

Common Misconceptions

• Students may not pay attention to the units of measurement and try to perform operations without converting to a common unit first.	• Students may overgeneralize the base-10 structure and apply it to measurement conversions, such as when subtracting 4 inches from 3 feet, taking one foot from the 3 feet and

	regrouping it as 10 inches.

Grade	*CCSS Domain*	*CCSS Cluster*
5	**Measurement and Data**	**Represent and interpret data**

Cluster Standard: 5.MD.B.2

Standard	Standards for Mathematical Practice
Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). 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.	• **SMP 2:** Reason abstractly and quantitatively. • **SMP 5:** Use appropriate tools strategically. • **SMP 1**: Make sense of problems and persevere in solving them.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Grade 5 students grow in their skill and understanding of fraction arithmetic, including multiplying a fraction by a fraction, dividing a unit fraction by a whole number or a whole number by a unit fraction, and adding and subtracting fractions with unlike denominators. Students can use these skills to solve problems, including problems that arise from analyzing line plots. For example, given five graduated cylinders with different measures of liquid in each, students might find the amount of liquid each cylinder would contain if the total amount in all the cylinders were redistributed equally. (Students in Grade 6 will view the answer to this question as the mean value for the data set in questions.)	• Identify benchmark fractions. • Make a line plot to display a data set of measurements in fractions of a unit. • Solve problems involving information presented in line plots which use fractions of a unit by adding, subtracting, multiplying, and dividing fractions.
DOK	**Blooms**
1-2	Remember, Apply

Common Misconceptions	
• Students may confuse various parts of the graph. Consider showing graphs that are incorrectly displayed and discuss why they are incorrect.	

Grade	*CCSS Domain*	*CCSS Cluster*
5	**Measurement and Data**	**Geometric measurement: understand concepts of volume**

Cluster Standard: 5.MD.C.3

Standard	Standards for Mathematical Practice
Recognize volume as an attribute of solid figures and understand concepts of volume measurement. • 5.MD.C.3.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. • 5.MD.C.3.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.	• **SMP 6:** Attend to precision. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• "Packing" volume is more difficult than iterating a unit to measure length and measuring area by tiling. Students learn about a unit of volume, such as a cube with a side length of 1 unit, called a unit cube.	• Explain that volume is the measurement of the space inside a solid three-dimensional figure. • Explain that a unit cube has 1 cubic unit of volume and is used to measure volume of three-dimensional shapes. • Explain that any solid figure packed without gaps or overlaps and filled with n unit cubes indicates the total cubic units or volume.
DOK	**Blooms**

1	Remember

Grade	*CCSS Domain*	*CCSS Cluster*
5	**Measurement and Data**	**Geometric measurement: understand concepts of volume**

Cluster Standard: 5.MD.C.4

Standard	**Standards for Mathematical Practice**
Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	• **SMP 4:** Model with mathematics. • **SMP 5:** Use appropriate tools strategically. • **SMP 6:** Attend to precision.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• They pack cubes (without gaps) into right rectangular prisms and count the cubes to determine the volume or build right rectangular prisms from cubes and see the layers as they build.	• Measure volume by counting unit cubes, cubic cm, cubic in, cubic ft, and improvised units.
DOK	**Blooms**
1-2	Understand, Apply

Grade	*CCSS Domain*	*CCSS Cluster*
5	**Measurement and Data**	**Geometric measurement: understand concepts of volume**

Cluster Standard: 5.MD.C.5

NEW MEXICO
Public Education Department

New Mexico Instructional Scope

5th Grade Measurement and Data Guide

Standard	Standards for Mathematical Practice
Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. • 5.MD.C.5.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. • 5.MD.C.5.B: Apply the formulas V = l × w × h and V = b × 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. • 5.MD.C.5.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	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 4:** Model with mathematics. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students understand that multiplying the length times the width of a right rectangular prism can be viewed as determining how many cubes would be in each layer if the prism were packed with or built up from unit cubes. They also learn that the height of the prism tells how many layers would fit in the prism.	• Identify a right rectangular prism. • Multiply the three dimensions in any order to calculate volume (Commutative and Associative properties). • Recognize that “B” refers to the area of the base. • Recognize volume as additive. • Develop a volume formula for a rectangle prism by comparing volume when filled with cubes to volume by multiplying the height by the area of the base, or when multiplying the edge lengths (l x w x h). • Apply the following formulas to right rectangular prisms having whole number edge lengths in the context of real-world mathematical problems: Volume = length x width x height or Volume = area of base x height. • Solve real world problems by decomposing a solid figure into two non-overlapping right rectangular prisms and adding their volumes. • Find the volume of a right rectangular prism with

	whole number side lengths by packing it with unit cubes.
DOK	**Blooms**
2-3	Understand, Apply, Analyze

Common Misconceptions

• Students might try to measure volume with square or linear units.	• Students may label volume with the wrong unit or read the shorthand for volume as 32 feet cubed rather than accurately reading it as 32 cubic feet.

ASSESSMENT GUIDE

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

Grade	*CCSS Domain*	*CCSS Strand*
5	**Measurement and Data**	**Convert like measurement units within a given measurement system**
	Sample Task #1 (Constructed Response)	
	Jimmy made 3 quarts of lemonade to serve at lunch. a. How many cups of lemonade did Jimmy make? Show your work or explain how you know. b. After lunch, 2 pints of lemonade remained. How many pints of lemonade did people drink at lunch?	
	Sample Task #2 (Multiple Choice)	
	A sunflower plant grew 73 centimeters in 3 weeks. How many meters did the plant grow in these 3 weeks? A. 0.073 meter B. 0.73 meter C. 7.3 meters D. 7300.0 meters	

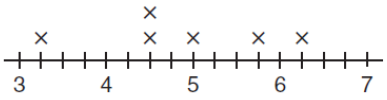
Grade	*CCSS Domain*	*CCSS Strand*
5	**Measurement and Data**	**Represent and interpret data**

Sample Task #1 (Constructed Response)

1. Jack owns a produce stand. He recorded the weights, in pounds, of the baskets of peaches for sale.

$$3\frac{1}{4}, 5\frac{3}{4}, 6\frac{1}{8}, 4\frac{1}{2}, 5, 3\frac{1}{8}, 6\frac{1}{4}, 4\frac{1}{2}$$

Jack made this line plot of the data.



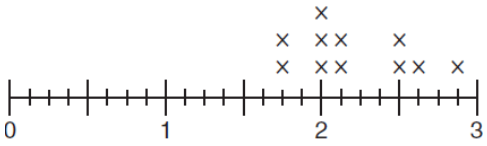
Weights of Baskets of Peaches (pounds)

Jack made some mistakes on his line plot.

a. What mistakes did Jack make on the line plot? Show your work or explain how you know.

Sample Task #2 (Multiple Choice)

2. This line plot shows the heights, in inches, of 11 bean plants.



Bean Plant Heights (inches)

What is the difference in height between the shortest and tallest bean plants?

Ⓐ $\frac{7}{8}$ inches

Ⓑ $1\frac{1}{8}$ inches

Ⓒ $1\frac{6}{8}$ inches

Ⓓ $2\frac{7}{8}$ inches

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
5th Grade Measurement and Data Guide

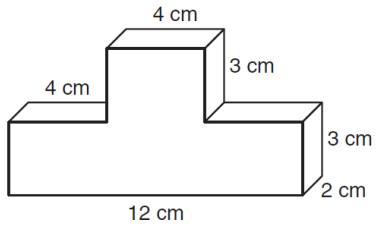
Grade	*CCSS Domain*	*CCSS Strand*
5	**Measurement and Data**	**Geometric measurement: understand concepts of volume**

Sample Task #1 (Constructed Response)

An ice cube tray has two rows of 8 ice cubes. How many ice cubes are in a stack of 12 ice cube trays? Draw a picture to explain your reasoning.

Sample Task #2 (Multiple Choice)

This figure is formed by two rectangular prisms.



What is the volume of the figure?

Ⓐ 28 cubic centimeters
Ⓑ 84 cubic centimeters
Ⓒ 96 cubic centimeters
Ⓓ 120 cubic centimeters

MLSS AND CLR GUIDE

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

CCSS Domain	*CCSS Cluster*
Measurement and Data	**Convert like measurement units within a given measurement system**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on conversion of like measurements within a given measurement system, consider options for learning from your families and communities the cultural

	and linguistic ways this mathematics exists outside of school to create stronger home to school connections for students. For example, students can measure the length of three items at home and express the length in standard and customary units.	
Cross-Curricular Connections	Science: In fifth grade the NGSS recommends students work with measurement related to conservation of mass. Consider providing a connection for students to determine the mass of an object in different states in two different units and then convert one unit unto the other to discover that they are equivalent. Art: Making a model of an object involves having to convert from larger to small units. Consider providing a connection for students to make a scaled model of something involving simple polygons or polyhedrons.	
Validate/Affirm/Build/ Bridge	• *How can you design your mathematics classroom to intentionally and purposefully legitimize the home culture and languages of students and reverse the negative stereotypes regarding the mathematical abilities of students of marginalized cultures and languages?* • *How can you create connections between the cultural and linguistic behaviors of your students' home culture and language, the culture and language of school mathematics to support students in creating mathematical identities as capable mathematicians that can use mathematics within school and society?*	• Using and Connecting Mathematical Representations: The standard for mathematical practice, use appropriate tools strategically, provides a strong foundation to validate and bridge for students. Mathematical representations are mathematical tools. The linguistic and cultural experiences of students provide different and varied types of representations for solving mathematical problems. By explicitly encouraging students to use multiple mathematical representations students can draw on their "mathematical, social, and cultural competence". By valuing these representations and discussing them we can connect student representations to the representations of school mathematics and build a bridge for students to position them as competent and capable mathematicians. For example, when studying conversion of like measurement units within the given measurement system the use of mathematical representations within the classroom is critical because students' knowledge and experiences will be used as resources for mathematical learning. Students will utilize their experience with conversions while using tools such as conversion charts and models of base ten conversions within the metric system. Students will discover the relationship between base ten conversions within the metric system to make connections to their background knowledge. They will use this experience to make sense of word problems they solve using customary and standard measurement conversions.

Planning for Multi-Layered System of Supports

NEW MEXICO
Public Education Department

New Mexico Instructional Scope

5th Grade Measurement and Data Guide

Vertical Alignment		
Previous Learning	***Current Learning***	***Future Learning***
• Connect to understanding the relative sizes of measurement units within a system. **(4.MD.1)** • Connect to using the four operations to solve word problems including problems involving fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. **(4.MD.2)**	• Connect to the powers of 10, which relates to converting metric measurements. **(5.NBT.2)** • Connect to working to perform operations with multi-digit whole numbers and with decimals to hundredths. **(5.NBT.5-7)**	• Connect to using ratios to convert measurement units. Connect to manipulating and transforming units appropriately when multiplying or dividing quantities. **(6.RP.3d)**

Suggested Instructional Strategies

Pre-Teach

Level of Intensity	*Essential Question*	*Examples*
Targeted	*What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?*	For example, some learners may benefit from targeted pre-teaching that uses images/resources (especially those being used the first time) when studying conversion of like measurement units within a given measurement system, because in this cluster students begin with using a table to make conversions. They will convert both customary and standard measurements within the same system of measurement and solve multistep word problems. 5th graders will discover base 10 conversions within the metric system, 1 kilometer= 1,000 meters.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	3.OA.C.7: This standard provides a foundation for work with conversion of like measurement units within a given measurement system, because students multiply and divide within 100. If students have unfinished learning within this standard, based on assessment data, consider ways to provide intensive pre-teaching support prior to the start of the unit to ensure students are ready to access grade level instruction and assignments.

Re-Teach

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
5th Grade Measurement and Data Guide

Level of Intensity	*Essential Question*	*Examples*
Targeted	What formative assessment data (e.g., tasks, exit tickets, observations) will help identify content needing to be revisited during a unit?	For example, students may benefit from re-engaging with content during a unit on conversion of like measurement units within a given measurement system by clarifying mathematical ideas and/or concepts through a short mini-lesson because focus should be on how to convert measurements into larger or smaller units within a measurement system by reinforcing place value for whole numbers and decimals.
Intensive	What assessment data will help identify content needing to be revisited for intensive interventions?	For example, some students may benefit from intensive extra time during and after a unit on conversion of like measurement units within a given measurement system by confronting student misconceptions because some students may not pay attention to the unit of measurement when subtracting. For example, when subtracting 5 inches from 2 feet (2ft-5in), students may incorrectly think the answer is 1 ft. 5 inches instead of 1 foot and 7 inches. To address this misconception, talk about and show the example of using 2 twelve-inch rulers, then subtract.
Extension		
Essential Question		*Examples*
What type of extension will offer additional challenges to 'broaden' your student's knowledge of the mathematics developed within your HQIM?		For example, some learners may benefit from an extension such as open ended tasks linking multiple disciplines when studying the conversion of like measurement units within a given measurement system because it promotes student practice to solve real world problems involving conversions, use the vocabulary associated with the metric and customary conversions, and gain understanding on the relationship between units and how to do conversions.

CCSS Domain	*CCSS Cluster*
Measurement and Data	**Represent and interpret data**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on representation and interpretation of data, consider options for learning from your families and communities the cultural and linguistic ways this mathematics exists outside of school to create stronger home to school connections for students. For example, students can measure their families' hand to the nearest ⅛ of an inch, construct a line plot with the information gathered and display, analyze, and interpret their family line plot.	
Cross-Curricular Connections	Science: In fifth grade the NGSS recommends students work with measurement related to conservation of mass. Consider providing a connection for students to determine the mass of various objects in different states in that measure in fractional units. Then have students graph and analyze that data. Social Studies: In fifth grade the New Mexico Social Studies Standards state students should "gather, organize and interpret information using a variety of media and technology". Consider having students gather, graph and analyze data that contains measurements in fractions of a unit.	
Validate/Affirm/Build/ Bridge	• *How can you design your mathematics classroom to intentionally and purposefully legitimize the home culture and languages of students and reverse the negative stereotypes regarding the mathematical abilities of students of marginalized cultures and languages?* • *How can you create connections between the cultural and linguistic behaviors of your students' home culture and language, the culture and language of school mathematics to support students in creating mathematical identities as capable mathematicians that can use mathematics within school and society?*	• Supporting Productive Struggle in Learning Mathematics: The standard for mathematical practice, makes sense of mathematics and persevere in solving them is the foundation for supporting productive struggle in the mathematics classroom. "Too frequently, historically marginalized students are overrepresented in classes that focus on memorizing and practicing procedures and rarely provide opportunities for students to think and figure things out for themselves. When students in these classes struggle, the teacher often tells them what to do without building their capacity for persistence." Teachers need to provide tasks that challenge students and maintain that challenge while encouraging them to persist. This encouragement or "warm-demander" requires a strong relationship with students and an understanding of the culture of the students. For example, when studying representation and interpretation of data supporting productive struggle is critical because students will need to make sense of measured objects and plots on a number line to solve everyday problems. Students will use reasoning and connections to their background to display, interpret, and analyze their own line plots.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	*Current Learning*	*Future Learning*
• Connect to generating data by measuring lengths and making line plots using that data. **(3.MD.4)** • Connect to solving addition and subtraction problems using the data on line plots. **(4.MD.4)**	• Connect to growing in their skill and understanding of fraction arithmetic. **(5.NF)**	• Connect to displaying numerical data in plots on number lines, dot plots, histograms, and boxplots and choosing the most appropriate graph/plot for the data. **(6.SP.4)**

Suggested Instructional Strategies

Pre-Teach

Level of Intensity	*Essential Question*	*Examples*
Targeted	*What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?*	For example, some learners may benefit from targeted pre-teaching that previews new contexts for tasks within the unit (e.g., cell phone plans) when studying representation and interpretation of data because this cluster focuses on solving problems using line plots created to display measurement data in fractions of a unit.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	4.MD.B.4: This standard provides a foundation for work with representation and interpretation of data because students begin to make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8) and solve problems involving addition and subtraction of fractions by using information presented in line plots. If students have unfinished learning within this standard, based on assessment data, consider ways to provide intensive pre-teaching support prior to the start of the unit to ensure students are ready to access grade level instruction and assignments.

Re-Teach

Level of Intensity	*Essential Question*	*Examples*

Targeted	What formative assessment data (e.g., tasks, exit tickets, observations) will help identify content needing to be revisited during a unit?	For example, students may benefit from re-engaging with content during a unit on representation and interpretation of data by clarifying mathematical ideas and/or concepts through a short mini-lesson because students are building their experience in measuring objects to one-eighth of a unit, constructing a line plot with information gathered, and display, analyze, and interpret their own line plot.
Intensive	What assessment data will help identify content needing to be revisited for intensive interventions?	For example, some students may benefit from intensive extra time during and after a unit on representation and interpretation of data by helping students move from specific answers to generalizations for certain types of problems because some students may not know what measurement to use if the object measures between ⅛ and ¼ inch. To address this, help students understand that approximations can be used to measure to the closest ⅛ inch and ¼ inch.

Extension	
Essential Question	***Examples***
What type of extension will offer additional challenges to 'broaden' your student's knowledge of the mathematics developed within your HQIM?	For example, some learners may benefit from an extension such as open ended tasks linking multiple disciplines when studying representation and interpretation of data because data is more meaningful to students if it is their own project or idea; students create their own data, measure objects to the nearest ⅛ inch, construct line plot, and display, analyze, and interpret their line plot to draw conclusions.

CCSS Domain	***CCSS Cluster***
Measurement and Data	**Geometric measurement: understand concepts of volume**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on understanding volume concepts, consider options for learning from your families and communities the cultural and linguistic ways this mathematics exists outside of school to create stronger home to school connections for students, for example, comparing the volume of multiple structures/objects found at home, or in the

	community will help students gain a deeper understanding of volume. Reasoning about the capacity of different size rooms in the home or around the community may help students make a connection to the significance of volume. Connecting packing cubes into a rectangular prism and packing items into a storage shed, or packages into a mail delivery truck may help students connect schoolwork to real-world examples found within the home or community.	
Cross-Curricular Connections	Science: In fifth grade the NGSS states students should "describe and graph quantities such as area and volume to address scientific questions." Consider providing a connection for students to determine the volume of cubes or rectangular prisms as part of their investigation. Art: Drawing boxes is connected to developing the ability to indicate perspective in a drawing. Consider providing an opportunity for students to sketch various boxes with the same volume but different dimensions. Also, consider allowing students to make boxes to pack inside of larger boxes (measuring 1in. X 1in. X 1in. or 1 cm. X 1cm. X 1cm.). Have students predict how many boxes can fit inside of the premade larger boxes. Connect the number of boxes used to the volume of the box. Allowing students to cut, and construct boxes will help with their fine motor skills.	
Validate/Affirm/Build/ Bridge	• *How can you design your mathematics classroom to intentionally and purposefully legitimize the home culture and languages of students and reverse the negative stereotypes regarding the mathematical abilities of students of marginalized cultures and languages?* • *How can you create connections between the cultural and linguistic behaviors of your students' home culture and language, the culture and language of school mathematics to support students in creating mathematical identities as capable mathematicians that can use mathematics within school and society?*	• Equity Based Practice (Using and Connecting Mathematical Representations): The standard for mathematical practice, use appropriate tools strategically, provides a strong foundation to validate and bridge for students. Mathematical representations are mathematical tools. The linguistic and cultural experiences of students provide different and varied types of representations for solving mathematical problems. By explicitly encouraging students to use multiple mathematical representations students can draw on their "mathematical, social, and cultural competence". By valuing these representations and discussing them we can connect student representations to the representations of school mathematics and build a bridge for students to position them as competent and capable mathematicians. For example, when studying understanding volume 63 6 concepts, the use of mathematical representations within the classroom is critical because students can use a variety of mathematical representations that they are already familiar with. This helps students connect to prior knowledge and allows them to use what they already know to connect to new concepts. Encourage students to use examples of things they see and experience in their everyday lives as mathematical

		representations of volume. Validate students' thinking, as they make connections to volume in the real-world and within their own environments. Encourage students to use multiple representations to show their mathematical thinking around volume and their everyday lives. Allowing students the time to share ideas, thoughts, and representations will give students an insight into the lives of other students.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	*Current Learning*	*Future Learning*
• Connect to creating 3-D shapes. **(1.G.2b)** • Connect to learning to measure area using unit squares **(3.MD.6)** • Connect to applying the formulas to determine area and perimeter of rectangles. **(4.MD.3)**	• Connect to fluently multiplying multi-digit whole numbers. **(5.NBT.5)**	• Connect to finding the volume of right rectangular prisms with fractional dimensions in the context of solving real-world and mathematical problems. **(6.G.2)**

Suggested Instructional Strategies

Pre-Teach

Level of Intensity	*Essential Question*	*Examples*
Targeted	*What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?*	For example, some learners may benefit from targeted pre-teaching that uses images/resources (especially those being used the first time) when studying understanding of volume concepts because "this is the first time that students begin exploring the concept of volume. In previous grades students worked with area and covering spaces. The concept of volume should be extended from area with the idea that students are covering an area (the bottom of a cube) with a layer of unit cubes and then adding layers of unit cubes on top of the bottom layer. Students should have ample experiences with concrete manipulatives before moving to pictorial representations." Students will then derive the formula for calculating volume from their concrete

		understanding based on model representations.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	3.MD.C.5 Recognize area as an attribute of plane figures and understand concepts of area measurement: This standard provides a foundation for work with understanding volume concepts because students use their understanding of area to make sense of volume. If students have unfinished learning within this standard, based on assessment data, consider ways to provide intensive pre-teaching support prior to the start of the unit to ensure students are ready to access grade level instruction and assignments.

Universal Support Framework

A student should know/understand...	A student should be able to do...	***Potential Scaffolds***

• Volume is an attribute of solid figures and is measured in cubic units.
• Volume is filling an object without gaps and without overlaps.
• Volume can be found by multiplying dimensions or by multiplying height by the area of the base.
• Volume of two right rectangular prisms is additive.
	• Measure volume by counting unit cubes
	• Find volume by packing a right rectangular prism with unit cubes.
	• Use dimensions to write and apply the formula for volume for right rectangular prisms.
	• Find the volume of solid figures composed of two non-overlapping right rectangular prisms.
		• Build on students' experience with the following skills:
		  ○ Calculate the area of a base (l x w)
		  ○ Recognize that volume is an attribute of a three-dimensional space.
		  ○ Decompose three-dimensional rectangular prisms into layers and arrays of cubes.
		  ○ Count squares to find area will now be count cubes to find volume
		• Cognitive Strategies
		  ○ Repeatedly model the strategies
		  ○ Monitor the students' use of the strategies
		  ○ Provide feedback to students
		  ○ Teach self-questioning and self-monitoring strategies
		  ○ Introduce multiple means of representation for mathematical ideas
		• Encourage students to use alternative tools to better access the grade level content. Examples include:
		  ○ **Snap cubes**
		  ○ **Centimeter cubes**
		  ○

Re-Teach		
Level of Intensity	***Essential Question***	***Examples***
Targeted	What formative assessment data (e.g., tasks, exit tickets, observations) will help identify content needing to be revisited during a unit?	For example, students may benefit from re-engaging with content during a unit on understanding volume concepts by examining tasks from a different perspective through a short mini lesson because students can gain a better understanding of concepts by analyzing models created by other students. There are multiple ways models can be constructed and used to calculate volume. Students will gain a deeper understanding of volume by engaging with models created by other students. Give students the opportunity to analyze, engage and interact with multiple perspectives/models of representation. Allow students the time to explain their thinking and make connections between different methods of representation.
Intensive	What assessment data will help identify content needing to be revisited for intensive interventions?	For example, some students may benefit from intensive extra time during and after a unit of understanding volume concepts by addressing conceptual understanding because students must understand what volume is before they can interact with real-world problems involving volume. Allow students time to deconstruct pre-made models in an attempt to understand that “volume is the amount of space that an object takes up and is measured in cubic units such as cubic inches or cubic centimeters”; hence the model is constructed of 3-dimensional cubes (measuring 1in. X 1in. X 1in. or 1 cm. X 1cm. X 1cm.).
Extension		
Essential Question		***Examples***
What type of extension will offer additional challenges to ‘broaden’ your student’s knowledge of the mathematics developed within your HQIM?		For example, some learners may benefit from an extension such as the application of and development of abstract thinking skills when studying understanding of volume concepts because they are able to grasp the concepts of volume easily. Allow these students to derive and use formulas for calculating volume based on their conceptual understanding of volume. These students will benefit from interacting with real-world problems

	involving volume in which they need to use a formula to solve. Allow students to show their thinking through images, concepts, facts, language, and procedures2. Expose students to questions that require them to calculate multiple numerical volumes and combine or decompose them, in order to arrive at a solution. Expose students to real-world mathematical problems that are connected to other discipline areas (e.g., science/social studies). Students may also benefit from problems that have multiple solutions based on the strategy the student applies.