

3.MD: MEASUREMENT & DATA

Cluster Statement: D: Geometric measurement: recognize perimeter.
Additional Cluster (Students should spend the large majority of their time (65-85%) on the major work of the grade/course. Supporting work and, where appropriate, additional work should be connected to and engage students in the major work of the grade.)

<p>Standard Text</p> <p>3.MD.D.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.</p>	<p>Standard for Mathematical Practices</p> <p>SMP1: Students can make sense of problems and persevere in solving them by solving one- and two-step problems involving perimeter of polygons including finding rectangles with the same perimeter & different areas as well as rectangles with the same area and different perimeters.</p> <p>SMP 4: Students can model with mathematics by using models to show some rectangles can have the same perimeter with different areas and that others can have the same area, but different perimeters.</p> <p>SMP 8: Students look for and express regularity in repeated reasoning by noticing short cuts for finding the perimeter of a rectangles (i.e. twice the length plus twice the width, or multiplying the length by the number of sides for any regular shape such as a square).</p>	<p>Students who demonstrate understanding can:</p> <ul style="list-style-type: none"> • Solve problems involving perimeters of polygons • Determine the perimeter given the side lengths • Determine an unknown side length given the perimeter • Illustrate how multiple rectangles can have same perimeters and different areas or vice-versa
		<p>Depth of Knowledge: 1-2</p>
		<p>Bloom’s Taxonomy: Understand, Apply and Analyze</p>
<p>Previous Learning Connections</p> <ul style="list-style-type: none"> • Connect to measuring the length of an object by selecting and using appropriate tools such as rulers, yardsticks meter sticks, and measuring tapes. (2.MD.1) • Connect to using 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 	<p>Current Learning Connections</p> <ul style="list-style-type: none"> • Connect to solving two-step word problems using the four operations and representing these problems using equations with a letter standing for the unknown quantity. (3.OA.8) 	<p>Future Learning Connections</p> <ul style="list-style-type: none"> • Connect to applying the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor. (4.MD.3)

<p>rulers) and equations with a symbol for the unknown number to represent the problem. (2.MD.5)</p>		
<p>Clarification Statement: 3.MD.D.8: Perimeter problems for rectangles and parallelograms often give only the lengths of two adjacent sides or only show numbers for these sides in a drawing of the shape. The common error is to add just those two numbers. Having students first label the lengths of the other two sides as a reminder is helpful. Students then find unknown side lengths in more difficult “missing measurements” problems and other types of perimeter problems.</p>		
<p>Common Misconceptions</p> <ul style="list-style-type: none"> ● Students may confuse area and perimeter. ● Students may not recognize that all rectangles have four dimensions, especially when only two side lengths are shown or provided. 		
<p>Multi-Layered System of Supports (MLSS)/Suggested Instructional Strategies</p> <p>Pre-Teach</p> <p>Pre-teach (targeted) <i>What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?</i></p> <ul style="list-style-type: none"> ● For example, some learners may benefit from targeted pre-teaching that rehearses prior learning when studying recognizing perimeter as an attribute of plane figures and distinguishes between linear and area measures because students build on prior knowledge of recognizing polygons and knowing their attributes and measuring and estimating lengths in standard units. <p>Pre-teach (intensive) <i>What critical understandings will prepare students to access the mathematics for this cluster?</i></p> <ul style="list-style-type: none"> ● 2.MD.A.1: This standard provides a foundation for work with recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures because students will be measuring the distance around polygons using standard units and using these measurements to find the perimeter. 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. <p>Core Instruction</p> <p><i>Access</i></p> <p>Interest: <i>How will the learning for students provide multiple options for recruiting student interest?</i></p> <ul style="list-style-type: none"> ● For example, learners recognize perimeter as an attribute of plane figures and distinguish between linear and area measures benefit creating an accepting and supportive classroom climate because students need to feel safe and supported in their environment so they are willing to take risks and make mistakes so they can do their best learning. If students feel supported and safe then they know they can approach math in a way that makes sense to them and are supported by their teacher and peers. Activities or tasks are chosen to foster the use of imagination, to solve novel and relevant problems, or to make sense of complex ideas in creative ways. <p><i>Build</i></p> <p>Effort and Persistence: <i>How will the learning for students provide options for sustaining effort and persistence?</i></p>		

- For example, learners engaging with recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures benefit when learning experiences attend to student's attention and affect to support sustained effort and concentration such as encouraging and supporting opportunities for peer interactions and supports (e.g., peer-tutors) because using flexible grouping gives students the opportunity to ask questions, ask for clarification, or encourage one another through coaching and the use of questioning when students get stuck. Students working in groups are encouraged to persevere and are celebrated for their thinking and effort. Students may use different strategies to figure out the perimeter of a two-dimensional figure. Students may use different manipulatives but are still exploring finding the perimeter.

Talking with peers provides opportunities for students to sustain their effort and perseverance.

Language and Symbols: How will the learning for students provide alternative representations to ensure accessibility, clarity and comprehensibility for all learners? (e.g., a graph illustrating the relationship between two variables may be informative to one learner and inaccessible or puzzling to another; picture or image may carry very different meanings for learners from differing cultural or familial backgrounds)

- For example, learners engaging with recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures benefit when learning experiences attend to the linguistic and nonlinguistic representations of mathematics to ensure clarity can comprehensibility for all learners such as pre-teaching vocabulary and symbols, especially in ways that promote connection to the learners' experience and prior knowledge because it's important for students to have an understanding of important mathematical vocabulary so it doesn't impede their learning during the lesson. Before the lesson begins, the teacher may break down the objectives and use pictures, examples, or different words to pre teach vocabulary and symbols. This gives the students background knowledge and helps students make connections to their own experiences and prior knowledge.

Expression and Communication: How will the learning provide multiple modalities for students to easily express knowledge, ideas, and concepts in the learning environment?

- For example, learners engaging with recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures benefit when learning experiences attend to the multiple ways students can express knowledge, ideas, and concepts such as solving problems using a variety of strategies because it allows for students to solve the problem in a way that makes sense to them and allows them to be able to talk about their thinking and their strategy when finding the perimeter of two-dimensional figures.

Internalize

Executive Functions: How will the learning for students support the development of executive functions to allow them to take advantage of their environment?

- For example, learners engaging with recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures benefit when learning experiences provide opportunities for students to set goals; formulate plans; use tool and processes to support organization and memory; and analyze their growth in learning and how to build from it such as asking questions to guide self-monitoring and reflection because it is important for students to ask themselves questions as they learn and reflect on their learning. If students are consistently doing this then they know whether they understand or are still struggling with the concept.

Re-teach

Re-teach (targeted) What formative assessment data (e.g., tasks, exit tickets, observations) will help identify content needing to be revisiting during a unit?

- For example, students may benefit from re-engaging with content during a unit on recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures by clarifying mathematical ideas and/or concepts through a short mini-lesson because this gives

students time to explore more with perimeter and clear up their misconceptions. Students may need time to explore that perimeter is the distance around the shape, which is different from area.

Re-teach (intensive) What assessment data will help identify content needing to be revisited?

- For example, students may benefit from re-engaging with content during a unit on recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures by addressing conceptual understanding in a small group setting or pull out if needed. In a smaller group setting, the teacher will be able to monitor students' progress on a biweekly basis to assess student growth and their responses to intensive interventions.

Extension

What type of extension will offer additional challenges to 'broaden' your student's knowledge of mathematics developed within your HQIM?

- For example, some learners may benefit from an extension such as open ended tasks linking multiple disciplines when studying recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures because students can explore tasks that involve "Big Ideas" and spend time reasoning and making connections which the students can visualize, play, and investigate. This leads to a deeper understanding of the mathematical content.

Culturally and Linguistically Responsive Instruction:

Validate/Affirm: 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?

Build/Bridge: 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?

Tasks: The type of mathematical tasks and instruction students receive provides the foundation for students' mathematical learning and their mathematical identity. Tasks and instruction that provide greater access to the mathematics and convey the creativity of mathematics by allowing for multiple solution strategies and development of the standards for mathematical practice lead to more students viewing themselves mathematically successful capable mathematicians than tasks and instruction which define success as memorizing and repeating a procedure demonstrated by the teacher. For example, when studying recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures the types of mathematical tasks are critical because they should be accessible to ALL students. Choosing floor to ceiling tasks gives each student an opportunity to access the task at their level and build on and deepen their understanding of the mathematics being explored. Tasks should promote reasoning and problem solving, promote student discourse, and support students in productive struggle.

Standards Aligned Instructionally Embedded Formative Assessment Resources:

Source: Illustrative Mathematics for Grade 3 Measurement and Data; Geometric Measurement Shapes and Their Insides Task

<http://tasks.illustrativemathematics.org/content-standards/3/MD/D/tasks/1514>

3.MD.D. Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

There were no Cognia Testlets for this cluster of standards.

The purpose of this task is to help students differentiate between a polygon and the region inside of a polygon so that they understand what is being measured when the perimeter and area are being found.

Relevance to families and communities:

During a unit focused on recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures, 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.

Example 1: During a unit focused on perimeter, 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, learning about the different structures for the different units of measurement across the languages in your classroom can lead to a more robust understanding of units used for measurement for all students by making connections to the different structures of units of measurement used in other countries. Relate the metric system to the countries of origin of your students.

Example 2: During a unit focused on perimeter, 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, learning about the different ways perimeter is used in the home and community can be a great way to connect schools tasks with home tasks. Students can talk with their families about perimeter. What are some items in your home that have a perimeter? What units of measure would you use?

Example 3: During a unit focused on perimeter, 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, learning about the mathematics used within the different careers of your family and community can provide a strong connections between school and careers. What careers in their family or community would utilize perimeter? Maybe landscapers, interior designers, what about sports fields? Have you ever noticed the lines on the field or the court?

Cross-Curricular Connections:

Science: In third grade the NGSS states students should be able to “make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.” Consider providing a connection where students look at how perimeter can relate to the impact of weather-related hazards, such as wildfires and leaving containers of water around the perimeter of a property.

Social Studies: In third grade the New Mexico Social Studies Standards recommend students “identify the components of the Earth’s biosystems and their makeup (e.g., air, land, water, plants, and animals).” Consider providing opportunities for students to think about farmland and animals and how to best construct a fence for them within the context of perimeter.