

K.MD: MEASUREMENT & DATA

Cluster Statement: A: Describe and compare measurable attributes.

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>K.MD.A.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.</p>	<p>Standard for Mathematical Practices</p> <p>SMP 3: Students can construct viable arguments by describing measurable attributes of objects.</p> <p>SMP 6: Students can attend to precision by using specific and accurate language when describing attributes of objects.</p> <p>SMP 7: Students can look for and make use of structure by learning to discriminate among different measurable attributes.</p>	<p>Students who demonstrate understanding can:</p> <ul style="list-style-type: none"> Describe measurable attributes of objects, including length, weight, and size. Recognize that a single object has more than one measurable attribute. <p>Depth Of Knowledge: 2</p> <p>Bloom's Taxonomy: Remember and Understand</p>
<p>Standard Text</p> <p>K.MD.A.2: Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. <i>For example, directly compare the heights of two children and describe one child as taller/shorter.</i></p>	<p>Standard for Mathematical Practices</p> <p>SMP 3: Students can construct viable arguments by describing measurable attributes of objects.</p> <p>SMP 6: Students can attend to precision by using specific and accurate language when describing attributes of objects.</p>	<p>Students who demonstrate understanding can:</p> <ul style="list-style-type: none"> Compare two objects directly by placing them next to one another to determine which is longer or bigger. Compare two objects directly by holding one in each hand to determine which is heavier. Describe which of two objects has more or less of an attribute using vocabulary such as taller, longer, shorter, heavier and lighter <p>Depth Of Knowledge: 2-3</p> <p>Bloom's Taxonomy: Understand, Apply and Analyze</p>

<p>Previous Learning Connections</p> <ul style="list-style-type: none"> • Connect to comparing length and other attributes of objects, using the terms bigger, longer, and taller • Connect to comparing two objects by placing one on top of another and indicating which objects takes up more space • Connect to arranging objects in order according to characteristics or attributes, such as height 	<p>Current Learning Connections</p> <ul style="list-style-type: none"> • Connect to classifying objects into given categories; count the numbers of objects in each category and sort the categories by count (K.MD.3) • Connect to analyzing, describing, and comparing shapes to investigate measurable attributes (K.G) 	<p>Future Learning Connections</p> <ul style="list-style-type: none"> • Connect to ordering three objects by length; comparing the lengths of two objects indirectly by using a third object (1.MD.A.1)
<p>Clarification Statement:</p> <ul style="list-style-type: none"> • K.MD.A.1: Students often initially hold undifferentiated views of measurable attributes, saying that one object is “bigger” than another whether it is longer, or greater in area, or greater in volume, and so forth. For example, two students might both claim their block building is “the biggest.” Conversations about how they are comparing—one building may be taller (greater in length) and another may have a larger base (greater in area)—help students learn to discriminate and name these measurable attributes. As they discuss these situations and compare objects using different attributes, they learn to distinguish, label, and describe several measurable attributes of a single object. • K.MD.A.2: Kindergartners easily directly compare lengths in simple situations, such as comparing people’s heights, because standing next to each other automatically aligns one endpoint. However, in other situations they may initially compare only one endpoint of objects to say which is longer. Discussing such situations (e.g., when a child claims that he is “tallest” because he is standing on a chair) can help students resolve and coordinate perceptual and conceptual information when it conflicts. 		
<p>Common Misconceptions</p> <ul style="list-style-type: none"> • Believing that a larger object is automatically heavier. • Not understanding conservation of length (when an object is moved away from a second object it is being compared to, the length does not change) • Believing that an object is “bigger” or “smaller” based on a single attribute (e.g., a student stating that one book is bigger than another because it is longer when the other book may be wider and heavier) • Not lining up the ends of objects being compared 		
<p>Multi-Layered System of Supports (MLSS)/Suggested Instructional Strategies</p> <p>Pre-Teach</p> <p>Pre-teach (targeted)</p> <p>What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?</p> <p>For example, some learners may benefit from targeted pre-teaching that uses images/resources (especially those being used the first time) when studying describe and compare measurable attributes because students at this level need manipulatives and actual objects to explore and use for comparing measurable attributes of objects. Students need to hold and feel the objects. The exposure to objects being used in a lesson will benefit students when describing and comparing measurable attributes. These students will have a chance at feeling the mass of the objects, seeing which ones are shorter and longer, which objects are lighter and which ones are heavier. This will also influence their learning of vocabulary words since the teacher will be sort of front-loading for the actual lesson.</p>		

Pre-teach (intensive)

What critical understandings will prepare students to access the mathematics for this cluster?
Indicator 11.3 of the “New Mexico Early Learning Guidelines, Essential Indicator:” Demonstrates emerging knowledge of measurement: This standard provides a foundation for work with describe and compare measurable attributes because the student demonstrates an understanding of non-standard units to measure and make comparisons. It is important for students to have the foundation for measurement so they can move on in their learning continuum to describe the comparison of objects and their measurable attributes. 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.

Core Instruction

Access:

Interest: How will the learning for students provide multiple options for recruiting student interest?
For example, learners engaging with Describe and Compare measurable attributes benefit when learning experiences include ways to recruit interest such as creating socially relevant tasks because students at this level will need lots of experiences with objects that they have at hand in the classroom (scissors, glue, pencils, crayons, etc.) and manipulate them in the tasks, also the use of different manipulatives for measuring would be fun and gain their interest because some measuring tools might be shorter than others and the final measurements will be different if using different manipulatives. These students would definitely benefit from having them come up and compare each other’s height etc.

Build:

Effort and Persistence: How will the learning for students provide options for sustaining effort and persistence?

For example, learners engaging with Describe and Compare measurable attributes benefit when learning experiences attend to students attention and affect to support sustained effort and concentration such as creating cooperative learning groups with clear goals, roles, and responsibilities because by providing students the opportunity to work in small groups students will be able to talk to each other and describe and compare objects and this will allow all students to work through the assignment and get a deeper understanding that objects length and weight are separate measurements. Therefore the teachers main objective is to give the groups objects of different lengths and weight but at the same time be intentional in labeling them as well so that when sharing out students will be able to see that length and weight are different just because one object is longer does not mean it is heavier (keep in mind to provide multiple solutions to the task.

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 Describe and Compare measurable attributes benefit when learning experiences attend to the linguistic and nonlinguistic representations of mathematics to ensure clarity can comprehensibility for all learners such as embedding visual, non-linguistic supports for vocabulary clarification (pictures, videos, etc.) because describing and comparing objects is challenging for students when it comes to length and weight. If we provide students with physical representations of objects that are longer and shorter but the weight of the larger object is less than the shorter object through these experiences, students will be able to understand and come to the conclusion in which length and weight are separate measurements. As teachers we have to be intentional in the delivery of the lesson, we have to provide an array of supports for our diverse classroom. Some students have different learning modalities and by providing visual, video and tangible experiences the students will be able to describe and compare objects.

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 Describe and Compare measurable attributes benefit when learning experiences attend to the multiple ways students can express knowledge, ideas, and concepts such as using physical manipulatives (e.g., blocks, 3D models, base-ten blocks) because < in Kindergarten students need to have lots of experiences with tangible not abstract material at this time. Lots of hands on activities as much as possible and being intentional in the planning of lessons. Having a variety of different length objects and a variety of different weight objects and giving groups a variety of objects to compare the length and weight is imperative for the kiddos to begin to understand measurement and weight are separate and then being able to articulate their thinking about the objects for the task.

Internalize:

Comprehension: How will the learning for students support transforming accessible information into usable knowledge, knowledge that is accessible for future learning and decision-making?

For example, learners engaging with Describe and Compare measurable attributes benefit when learning experiences attend to students by intentionally building connections to prior understandings and experiences; relating important information to the learning goals; providing a process for meaning making of new learning; and, applying learning to new contexts such as incorporating explicit opportunities for review and practice because the understanding of measurable attributes is difficult to learn when you are a 5 year old. It would be necessary for a continuation of more tasks related to measurement, length vs. width, and capacity vs. weight. Students would need lots of practice with measurement in describing and comparing them. The task (activity) should have multiple solutions and before these there should be lots of teacher demonstrations.

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?

Examine assessments for evidence of lingering misconceptions (see common misconceptions). If students exhibit one more of these misconceptions, consider addressing the misconception by, for example, students may benefit from re-engaging with content during a unit on describe and compare measurable attributes by providing specific feedback to students on their work through a short mini-lesson because students at this level will have to work in partners or individually on a white board show their work, the teacher can quickly scan the room and see misunderstanding. Teachers can quickly have the child orally explain how they organize and compare the object's attributes. The child's thinking process might be exposed when explaining and the teacher will be able to help the child on the spot or in a small group. Targeted re-engagement can support students as they internalize the content while still maintaining the flow of the unit because they might be missing just a little piece, there must be a misunderstanding but if the rest of the students in the small group start questioning and the teacher providing assistance by providing sentence frames for the students to use this will feel less intrusive.

Re-teach (intensive)

What assessment data will help identify content needing to be revisited for intensive interventions?

Examine assessments for evidence of students still developing the underlying ideas for example, some students may benefit from intensive extra time during and after a unit Describe and Compare measurable attributes by confronting student misconceptions because five-year old children have misconceptions of measurement, they see things as smaller and bigger. This is a hard concept to learn for the little ones. Therefore, students will need lots of hands-on activities and experiences with measurement: weight, length and volume to begin to understand measuring.

Extension

<p>What type of extension will offer additional challenges to 'broaden' your student's knowledge of the mathematics developed within your HQIM? To extend students learning about describing and comparing measurable attributes, some learners may benefit from an extension such as the opportunity to explore links between various topics when studying to describe and compare measurable attributes because students will have the opportunity to explore other objects that they can measure specially the object permanence is hard for students to understand. Exploration time with liquids and different size flasks to pour in.</p>	
<p>Culturally and Linguistically Responsive Instruction:</p> <p>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?</p> <p>When planning with your HQIM consider how to modify tasks to represent the prior experiences, culture, language and interests of your students to "portray mathematics as useful and important in students' lives and promote students' lived experiences as important in mathematics class." Tasks can also be designed to "promote social justice [to] engage students in using mathematics to understand and eradicate social inequities (Gutstein 2006)." For example, when studying describing and comparing measurable attributes the types of mathematical tasks are critical because students will have a different understanding on what attributes the teacher is referring to. The vocabulary will be a major key component and modeling will also be crucial for students at this level since they all come with different levels of mathematics. Language could also be a factor to consider, so lots of pictures and actual objects will enhance and will aid in students moving in the learning of the math continuum.</p>	
<p>Standards Aligned Instructionally Embedded Formative Assessment Resources: Source: http://s3.amazonaws.com/illustrativemathematics/attachments/000/008/744/original/public_task_455.pdf?146239 The purpose of this task is for students to understand and practice using comparison language for height. Kindergarten students will often use the words "littler" and "bigger" when they compare themselves, but this could be weight rather than height. When students use comparison language specific to the attribute being measured (such as shorter/taller) rather than more generic comparison language (such as smaller/bigger) they are engaging in MP6, Attend to precision.</p>	
<p>Relevance to families and communities: During a unit focused on describing and comparing measurable attributes, 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 go on a shape hunt and draw 4 shapes they found at home and orally tell the parents which shapes they found and this interaction will lead to finding more shapes at home in their backyard etc. which in turn will help all students with the language aspect of the shapes but also with their own home language because this activity can be done in any language.</p>	<p>Cross-Curricular Connections:</p> <p>Science: In Kindergarten, the NGSS states students should "make observations (firsthand or from media) to collect data that can be used to make comparisons." Consider providing a connection for students to make direct comparisons based on length, width or size.</p> <p>Language Arts: Literature can offer connections about measurement such as: <i>The Giant Carrot</i> by Jan Peck and <i>Size</i> by Henry Pluckrose.</p>