MATHEMATICS

GRADE 1

Measure Me

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Rationale for Lesson and Associated Tasks
Students work with non-standard units as they complete the *Measure Me* task. The non-standard units should be items such as unifix cubes that do not have gaps between them when used. The students, working in partner pairs, will be asked to use the non-standard units to measure parts of the body.

The *Measure Me* task and associated activities provide students with the opportunity to practice precision when using mathematical tools and expand their vocabulary to include measurement terms. As students work with the tools and determine the specific beginning and ending places, they will develop the ability to see precise details. This ability to use tools with precision will allow students to develop the ability to think in more specific terms.

Lesson and Associated Tasks Overview
Illustrative Mathematics: ([click here](#))
Review all components of the task thoroughly.
For Grade 1 students portions of this lesson and associated tasks may best be completed in a small group setting with the teacher asking questions that will develop student thinking, vocabulary, and observation skills.
Important Note: After the children are comfortable with the task it can be set up as an independent discovery/learning station.
**This lesson is designed to be completed in one session.*
The Lesson
1. Introduce the *Measure Me* activity with the whole group. In a whole group setting, review the data collection sheet with the students. Have a sample sheet displayed on a whiteboard/smartboard or chart paper visible to all students. Explain that the students will be working with a partner using unifix cubes to find the length of various body parts.
2. Model measuring with the non-standard tool, unifix cubes. Unifix cubes are useful for this task since they can be connected eliminating gaps or overlaps.
3. Have students measure a partner using the unifix cubes. Discuss their results in context with the precise use of the tool. Did the students use the same endpoints? Did they count the cubes correctly?
4. Use the Think-Pair-Share method discussing the necessity of starting the measurement at the same place. Model what happens with the data if different endpoints are used.
5. Use Think-Pair-Share to determine standard endpoints for each of the body parts on the data collection sheets. Have a sample data collection sheet displayed on a chart table or smartboard visible to all students. Record the endpoints for each body length. Leave this displayed during the task.
6. Assign student partner pairs. Partner pairs will complete the data collection sheet.
7. In a whole group format, students will discuss their findings. Record responses on the large data collection form. Recording their findings validates the work done by the student pairs.

West Virginia College- and Career-Readiness State Standard
M.1.16
Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.

Mathematical Habits of Mind (MHM)
*While the lesson addresses several MHM, the MHM in bold font is the focus of the lesson and associated tasks.
MHM4. Model with mathematics.
MHM5. Use appropriate tools strategically.
MHM6. Attend to precision.

Mathematics Teaching Practices to Support Student Growth
- Facilitate meaningful mathematical discourse.
- Pose purposeful questions.
- Build procedural fluency from conceptual understanding.
- Elicit and use evidence of student thinking.

Essential Understandings
- Accurate measurement depends on the proper and precise use of measurement tools.

Set-up Phase
1. Become an Expert Regarding All Lesson and Associated Task Content
It is essential that the teacher becomes very familiar with the task and all associated materials. The level of student engagement will be determined by how thoroughly the teacher is able to promote and extend his/her observations.

2. Establish Small Groups
The *Measure Me* task promotes both individual and partner thinking. Students will make and share observations with both their partner and the teacher.

Skill level and personality should both be considered when developing the groups for this activity. Partners work best when the students have had some time to work together regularly. The ability to think deeply, share ideas, and ask questions will prove helpful in the successful completion of the task. When choosing the partners, it is important to eliminate a situation where one student may do all the observations and talking allowing the other partner to simply listen. For all students to benefit from the task, they must share equally in the roles of observing and sharing. Prepare responses and comments that students may use as they collaborate to find defining and non-defining characteristics.

3. Develop Open-Ended Questions
Teachers should create a list of open-ended questions designed to support and scaffold the learning for their students. These questions should purposefully direct students toward the learning goals and assist them with using their previously learned content.

These questions may include:
- What do you notice about the measurements?
- Are there measurements with the same length? Why?
- Are there measurements with different lengths? Why?
- Can you explain your thinking?
- Can you tell me more?

4. Gather Materials
- Non-standard measuring tools (unifix cubes are used in this task, enough for each partner pair to measure the longest part of the body)
- Data collection form: one can be found at this link, or the teacher may create his/her own.
- Large data collection form
- Pencils, clipboards
- Teacher Observation form

5. Anticipated Common Student Misconceptions
Teachers should be prepared to address possible misconceptions. By spending time prior to the lesson thinking through possible misconceptions, the teacher will have responses prepared. This task/activity is focused on the use of non-standard units of measure. Most of the misconceptions from this task will arise from not understanding how to correctly use measurement tools.
Misconceptions may include the following:
- Leaving gaps or overlapping the non-standard units thus getting an inaccurate result.
- Not using the name of the non-standard unit when describing the length of an object.
- Not using consistent endpoints.

Explore Phase
Prior to having the students work with a partner, it is important that they understand the task as well as the life skills of taking turns, listening to each other, and being a full participant in a pair. The non-standard unit and how to precisely measure an object should be discussed in a whole group setting prior to having students work independently with a partner.

During whole group time, the teacher can use the non-standard unit to measure common objects in the classroom, such as a desk/table, window, or door. During this exploration, it is important to point out the necessity of being precise with the tool such as measuring without leaving gaps or overlapping the non-standard unit as well as starting and stopping at the correct place.

Math centers/stations during this exploration phase should also allow for the students to spend time exploring and using non-standard units to measure objects.

Suggestions for stations include but are not limited to the following:
- Using one item and finding things around the classroom that are the same length, that are longer, and that are shorter.
- Putting sets of items in order by length.

Prior Instruction/Knowledge:

Kindergarten students recognize measurable attributes (length, area) from non-measurable attributes (longer, bigger) often without clarifying. For example, a student will say an object is bigger without being specific that the object is longer or greater in volume.

Grade 1 students learn that length is measured from one endpoint to another endpoint understanding that the unit of measure (manipulatives of the same length) must be used precisely.

Please review the following: The information below provides valuable insights into Kindergarten pre-requisite skills and First Grade student understandings specific to the analysis, comparison, and composing of 3-Dimensional objects.
Educators Guide for Mathematics Grade K: pages 23-26, pdf 25-28 ([click here](#))
Educators Guide for Mathematics Grade 1: pages 29-31, pdf 31-33 ([click here](#))

Prerequisite Skills
- Describe likenesses and differences between and among objects.

Supporting Skills
- Read and write numerals using one-to-one correspondence to match sets of 0 to 10.
- Describe, compare, and order objects using mathematical vocabulary.
- Measure length using nonstandard units.

Impending Skills
- Measure lengths in inches/centimeters using appropriate tools and units.

    Source: *The Quantile Framework for Mathematics*
    https://metametricsinc.com/educators/quantile-for-educators/
    2020 MetaMetrics Inc.

Implementation Phase
1. Introduce the *Measure Me* activity with the whole group.
2. Model measuring with the non-standard tool, unifix cubes.
3. Use the Think-Pair-Share method, discuss the necessity of starting the measurement at the same place.
4. Partner pairs will complete the data collection sheet
5. In a whole group format, students will discuss their findings.

Teacher Notes
**This lesson is designed to be completed in one session.
Prior to the first day of the task, conduct several measurement activities. These activities should be designed to highlight the necessity of being precise.
- Compare the lengths of 2 or more objects. Include in the activity examples when the items are not at the same starting point.
- Use non-standard units to measure an object. Include in the activity examples when the units have gaps or overlap.

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With first grade students, it is always wise to review content and model expectations prior to the actual task. Before assigning partners and allowing the students to begin working, it will be important to spend some time as a whole group reviewing the reasons for being precise when measuring. Choices for this review should be based on observations from the responses given in the previous days. In a whole group setting, the teacher will review the components of the data collection sheet and the proper way to use the nonstandard unit. Starting and stopping places for each data point will be determined to ensure that each student pair will collect accurate data. Depending on the number of adults in the room, the teacher may wish to have all the student pairs working on this task at the same time or may wish to have some at other math centers working independently while the teacher monitors two or three pairs of students.

When completing this task the first time, it is critical that every pair of students are using the same nonstandard unit. A best choice is one that does not allow for overlap or gaps such as unifix cubes. Each pair of students must be provided with enough unifix cubes to measure the longest body part, most likely this will be the leg.

Note: When the students can measure items accurately using nonstandard units without teacher support this task can be moved to an independent workstation. A recording sheet can be used to add accountability to the task.

Return to a whole group setting when all student pairs have finished collecting and recording their data. Have students share their findings. Use open-ended questions to guide and deepen the students' understanding of the need to be precise when measuring. (Refer to **Set Up Phase** #3)

Extensions of this task can include the following:
- Conduct a Room walk: Using a nonstandard unit, measure various items such as a book, desk, pencil, or chair.
- Find items in the room that are a specific length based on a nonstandard unit. For instance, find something that is 4 pencils long.
- Measure the same item with several different nonstandard units to help students understand the need for correct vocabulary.

Share, Discuss, and Analyze Phase
Essential Understanding:
Accurate measurement depends on the proper and precise use of measurement tools.
Share: This lesson opens with the students comparing lengths of items and using nonstandard units to measure. This format allows the teacher to monitor understanding as the students share their observations about the necessity of precision when measuring.
Discuss: Working in partner pairs, students use a nonstandard unit to measure various body parts and use a data collection form to record their findings. The teacher poses higher-order questions that will allow the students to think more deeply about the necessity for precision when using a measurement tool. At this stage, it is critical that the teacher addresses any misconceptions, and, assist the students in accuracy when using measurement tools.
Analyze: Students return to a whole group format to share the results of the *Measure Me* task. Higher-order questions (refer to **Set Up Phase** #3) along with more specific questions can be asked.

- Who had the longest/shortest leg/foot/arm etc.?
- How does accurate, precise measurement help you?

Task In Action

The video clips below provide a demonstration of the task being implemented in a classroom as it aligns with the Effective Mathematics Teaching Practice indicated. These clips should be used by the teacher to model the implementation of the task in his or her classroom.

- Facilitate Meaningful Mathematical Discourse
  - [Video Clip](#)

- Pose Purposeful Questions
  - [Video Clip](#)

- Build Procedural Fluency from Conceptual Understanding
  - [Video Clip](#)

- Elicit and Use Evidence of Student Thinking
  - [Video Clip 1](#)
  - [Video Clip 2](#)