CCGPS Frameworks Student Edition

Mathematics

Kindergarten Unit Five
Measuring and Analyzing Data

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"Making Education Work for All Georgians"

Unit 5: Measuring and Analyzing Data

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The Critical Areas are designed to bring focus to the standards at each grade by describing the big ideas that educators can use to build their curriculum and to guide instruction.

1. **Representing, relating, and operating on whole numbers, initially with sets of objects.** Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as $5 + 2 = 7$ and $7 – 2 = 5$. *(Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.)* Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.

OVERVIEW

As Marilyn Burns states, "Measurement is important in the mathematics curriculum because of its practicality and pervasiveness in so many aspects of everyday life. As students measure in different contexts, they develop understanding of important ideas about measurement as well as mathematical concepts from other strands of the curriculum, especially number and geometry (Burns, 2012)." Measurement is an important part of mathematics. In this unit, students will:

- Describe attributes of objects that are MEASUREABLE (length, weight, size, color, shape, etc.)
- Describe MULTIPLE measureable attributes of a single object
- Measure using direct comparison of TWO objects that have an attribute in common
- Describe the DIFFERENCE between the objects using the common attribute
- Classify object into GIVEN categories
- COUNT the number of objects in the categories
- Sort the CATEGORIES by the number of objects in each set

This unit will begin kindergarten students' first study of measurement. This is with direct comparison only. Rulers and other common measuring tools are not introduced until 2nd grade. In kindergarten, students should use terms such as longer/shorter, more/less, taller/shorter, and heavier/lighter. Students need many experiences like the ones outlined in the tasks in this unit to prepare them for the use of non-standard measurement in 1st grade and then standard measurement in 2nd grade. Each year, student's understanding of measurement will become more sophisticated.

Nowhere during the course of the year should a kindergarten student encounter standard units of measurement (rulers, etc.).

The foundational skills and understandings of measurement should be gleaned from the activities in this unit. Effective questioning from the teacher will ensure these skills and understandings are

realized. Underlying skills that are not commonly spoken about within measurement should also be focused upon to ensure a strong foundation in measurement. These skills are:

- When comparing two objects, they must be lined up end-to-end before an accurate measurement can be acquired.
- When measuring an object with units (such as connecting cubes), the units must be lined up end-to-end before an accurate measurement can be acquired.

These skills begin to lay the foundational understanding of the ruler units being laid end-to-end or side-by-side to measure an object. It also begin to form the idea that the ruler and the object must be laid end-to-end or at the starting point of for an accurate measurement.

Math Solutions. (2012). Retrieved January 8, 2012, from http://www.mathsolutions.com/index.cfm?page=wp8&crid=328#c2

Measurement Trajectory –*Putting It All Together*

Trajectory	**Nonstandard Units** Using objects such as blocks, pencils, boxes, etc. to measure attributes. It is important to remember that the objects must be of the same size (i.e. you would not use new pencils and used pencils to measure the same attribute).	**Standard Units** Using commonly understood units (i.e. inches, feet, centimeters, meters, ounces, pounds, cups, quarts, etc.) to measure attributes.	**Measuring with Tools** Understanding how to use the tools (i.e. scales, rulers, etc.) for measuring attributes and choosing the tool that is the most appropriate to complete the measurement.

Each concept builds on the previous idea and students should explore and construct concepts in such a sequence

Relationships in Measurement NCTM	**Attributes** Identify attributes of an object	**Order** Compare and order objects according to attributes	**Nonstandard** Understand how to use nonstandard units and why we measure with a unit	**Standard** Understand standard units of measure and why we use them	**Selecting Tools** Select the appropriate tools to measure attributes

Skills needed for success in Measurement

Concepts	**Attributes** Understand that attributes can be compared	**Measure** Filling, covering, matching, and making comparisons of attributes produces a number called a measure		**Tools** Tools can be used to make measuring easier

Skills	**Attributes** Identify attributes of an object that can be measured	**Tools** Select an appropriate unit to measure the attribute	**Relationships** Compare objects based on how many units it took to measure the attribute. Order objects based on the number of units used to measure the attribute.

Data Analysis Trajectory –*Putting It All Together*

Trajectory Van de Walle	**Confined to the Classroom** Collecting data helps students answer questions about the world around them. Kindergarten students should collect data from structured sets (has only one piece for each combination of values) and then from unstructured sets (can be classified in many different ways).	**Beyond the Classroom** Later students will begin to ask questions about the world beyond the classroom. The data will become more multi-faceted, but still focuses on answering questions and making sense of the world.	**Comparisons Between Groups** Students will then begin making comparisons between groups or sets of data and deciding how different groups affect the outcome of the data.	**Other Sources** Students will begin gathering data from other sources and will make determinations about how valid the data is according to what source it comes from.

Each concept builds on the previous idea and students should explore and construct concepts in such a sequence

Data Collection and Analysis NCTM	Describe how objects are alike or different	Identify attributes of objects	Classify objects according to their attributes	Identify number of objects in each category	Sort categories by count	Sort objects according to two or more attributes

The Big Picture in Kindergarten

Kindergarten children should be able to describe attributes of objects and classify these objects according to the identified attributes. Classifying objects is deciding how to categorize them and this is the most basic foundational skill of data analysis. Sorting objects into these identified categories is the beginning stages of organizing data. Going a step further and attaching a number to the set (10 or less in a set) is the bridge to displaying data in graphs and charts. Collecting data helps children answer questions about the world around them and this naturally follows the fundamental idea of data: to answer a question! Formulating questions and deciding how to represent information that has been collected requires one to decide what categories to create. Determining these categories and even changing categories to represent different attributes helps children make sense real world data. To develop this flexible reasoning about the characteristics of data, a student needs many experiences with categorizing attributes and representing the categories mathematically. Focusing on different attributes creates different classifications and later on in elementary, will produce different graphs.

STANDARDS FOR MATHEMATICAL CONTENT

Describe and compare measurable attributes.

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

Classify objects and count the number of objects in each category.

MCC.K.MD.3 Classify objects into given categories; count the numbers in each category and sort the categories by count. (*Limit category counts to less than or equal to 10)*

STANDARDS FOR MATHEMATICAL PRACTICE

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education.

Students are expected to:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

(For descriptors of standard cluster please see the Grade Level Overview)

ENDURING UNDERSTANDINGS

- Attributes can be compared
- Comparing attributes produces a number called a measure
- Selecting appropriate units to measure attributes
- Comparing length, weight, capacity, and height of objects is important
- Objects can be classified into categories
- The number of objects in a category is called a set
- A set can be counted
- Categories can be sorted according to the number of objects in the sets
- Information can be organized and recorded

ESSENTIAL QUESTIONS

- What qualities of an object can be measured?
- How can I compare 2 objects by their size?
- What does it mean to measure something?
- How can I measure something? Does how I measure matter?
- In what ways can I measure this object?
- How are things alike/different?
- What categories can I create from the identified attributes in these objects? Is there more than one way to sort them?
- How can I organize my information?

CONCEPTS /SKILLS TO MAINTAIN

Although many students may have attended pre-school prior to entering kindergarten, this is the first year of school for some students. For that reason, no concepts/skills to maintain will be listed at this time. It is expected that teachers will differentiate to accommodate those students that enter kindergarten with prior knowledge.

SELECTED TERMS AND SYMBOLS

The following terms and symbols are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.

The terms below are for **teacher reference only** and are not to be memorized by students. Teachers should first present these concepts to students with models and real life examples. Students should understand the concepts involved and be able to recognize and/or use them with words, models, pictures, or numbers.

- **capacity**
- **category**
- **classify**
- **heavier**
- **height**
- **length**
- **lighter**
- **longer**
- **shorter**
- **taller**
- **weight**
- **organize**

STRATEGIES FOR TEACHING AND LEARNING

Adapted from the Ohio DOE Mathematics Model Curriculum

It is critical for students to be able to identify and describe measureable attributes of objects. An object has different attributes that can be measured, like the height and weight of a can of food. When students compare shapes directly, the attribute becomes the focus. For example, when comparing the volume of two different boxes, ask students to discuss and justify their answers to these questions: Which box will hold the most? Which box will hold least? Will they hold the same amount? Students can decide to fill one box with dried beans then pour the beans into the other box to determine the answers to these questions.

Have students work in pairs to compare their arm spans. As they stand back-to-back with outstretched arms, compare the lengths of their spans, and then determine who has the smallest arm span. Ask students to explain their reasoning. Then ask students to suggest other measureable attributes of their bodies that they could directly compare, such as their height or the length of their feet.

Connect to other subject areas. For example, suppose that the students have been collecting rocks for classroom observation and they wanted to know if they have collected typical or unusual rocks. Ask students to discuss the measurable attributes of rocks. Lead them to first comparing the weights of the rocks. Have the class chose a rock that seems to be a "typical" rock. Provide the categories: *Lighter Than Our Typical Rock* and *Heavier Than Our Typical Rock*. Students can take turns holding a different rock from the collection and directly comparing its weight to the weight of the typical rock and placing it in the appropriate category. Some rocks will be left over because they have about the same weight as the typical rock. As a class, they count the number of rocks in each category and use these counts to order the categories and discuss whether they collected "typical" rocks.

Provide categories for students to use to sort a collection of objects. Each category can relate to only one attribute, like *Red* and *Not Red* or *Hexagon* and *Not Hexagon,* and contain up to 10 objects. Students count how many objects are in each category and then order the categories by the number of objects they contain.

Ask questions to initiate discussion about the attributes of shapes. Then have students sort a collection of two-dimensional and three-dimensional shapes by their attributes. Provide categories like *Circles* and *Not Circles* or *Flat* and *Not Flat*. Have students count the objects in each category and order the categories by the number of objects they contain.

Have students infer the classification of objects by guessing the rule for a sort. First, the teacher uses one attribute to sort objects into two loops or regions without labels. Then the students determine how the objects were sorted, suggest labels for the two categories and explain their reasoning.

COMMON MISCONCEPTIONS

- Comparing unlike attributes (comparing the weight of this object to the length of that one)
- The length of objects change according to how they are placed next to each other when measuring (not lining up the endpoints)
- Placing units for measurement with gaps (not placing units side-by-side)

EVIDENCE OF LEARNING

By the conclusion of this unit, students should be able to demonstrate the following competencies:

- Identify attributes
- Explain why we measure things, that how we measure matters, and what attributes about things can be measured (i.e. height, length, weight, distance, time).
- Compare and order two (2) objects relating to length, height, weight, capacity, and size.
- Select appropriate units to measure attributes
- Compare attributes and produce a comparison called a measure
- Classify objects according to like/different attributes
- Count the number of objects in a category
- Organize the categories according to how many are in the set
- Record information in an organized manner

TASKS

The following tasks represent the level of depth, rigor, and complexity expected of all kindergarten students. These tasks or a task of similar depth and rigor should be used to demonstrate evidence of learning. It is important that all standards of a task be addressed throughout the learning process so that students understand what is expected of them. While some tasks are identified as a performance task, they also may be used for teaching and learning (constructing task).

Scaffolding Task	Constructing Task	Practice Task	Performance Task
Tasks that build up to the constructing task.	Constructing understanding through deep/rich contextualized problem solving tasks	Games/activities	Summative assessment for the unit

Task Name	Task Type/ Grouping Strategy	Content Addressed
Measurement and Me!	Constructing Task *Partners*	Introduction to Measurement
Does How I Measure Matter?	Constructing Task *Partners*	Comparing length of 2 objects
Ribbon War	Practice Task *Large Group, Partners*	Comparing length of 2 objects
Comparing Towers	Practice Task Partners	Comparing length of 2 objects
Shorter or Longer?	Constructing Task Small Group or Partners	Comparing height of 2 objects
Taller Than a Tower of Ten	Practice Task *Small Group*	Comparing height of 2 objects
Rumplestiltskin Is My Name	Practice Task *Partners*	Comparing length of 2 names
Which is Longer?	Constructing Task Partners or Individuals	Comparing length of 2 sets of objects
Using a Balance Scale	Constructing Task Partners	Comparing weight of 2 objects
How Heavy Is It?	Practice Task *Small Groups*	Comparing weight of 2 objects
Ordering Containers	Constructing Task *Small Group*	Comparing capacity of 2 objects
Comparing Containers	Practice Task Partners	Comparing capacity of 2 objects
Riddle Me!	Practice Task Partners or Individuals	Comparing length, weight, height and capacity of 2 objects
Culminating Task Measurement Olympics	Performance Task *Partners*	Comparing length, weight, height, and capacity of 2 objects
Sorting Attribute Blocks	Constructing Task Partners	Classifying objects into categories
Fun with Sorting	Practice Task Small Group	Classifying objects into categories
Sorting Money!	Practice Task Partners	Classifying objects into categories
Who Lives at Your House?	Practice Task Partners	Classifying objects into categories
Culminating Task Guess My Sort	Performance Task Partners	Classifying objects into categories

CONSTRUCTING TASK: MEASUREMENT AND ME!

Approximately 1 day

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Students need to understand that they are comparing specific attributes of the objects. In order to do this, they must first identify the attribute to be measured. Objects often have multiple attributes that are measurable, but we compare only one at a time.

ESSENTIAL QUESTIONS

- What qualities of an object can be measured?
- What does it mean to measure something?
- How can I measure something?

MATERIALS

- Measuring Penny by Loreen Leedy or Me and the Measure of Things by Joan Sweeney or any other similar book
- Chart paper
- Bags with 2 items of various length, weight, height and capacity in each bag (examples could include: a box of crayons and a marker, another bag could have a shoe string and a child's belt, a different bag could have an empty bottle and a plastic cup)

GROUPING

Whole group and partner task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students together on meeting area and pose question, "What do you know about measurement?" Record the student responses on chart paper. Use this brainstorming time to activate student's prior knowledge, as well as to serve as a pre-assessment. After student responses have been recorded, the teacher may choose to share a book such as Measuring Penny by Loreen Leedy or Me and the Measure of Things by Joan Sweeney or any other similar book about measurement. When choosing a book, please be mindful that comparison of objects is the focus in kindergarten. Essential questions should be introduced in this part of the task. Brainstorm and record the different attributes that can be measured. You may choose to paraphrase the book, and use only the relevant sections.

Next, have partners come to the front and select a pre-made teacher bag. These bags will contain only two items. The partners should discuss what attributes can be measured when comparing the two objects; the teacher should circulate around the room and ask questions about the items to guide student thinking. For example, "Which item is heavier? Which item is longer? Which item is shorter? How did you know?" Partners should record their observations about the attributes of the two objects.

After all bags have been discussed, the teacher should guide students in a discussion to share the discovery of measureable attributes to close the introduction to measurement.

Teacher reflection questions:

- Are students able to compare objects by their size and explain why this would be important?
- Are students able to use mathematical language to describe the measurement of attributes of items?

FORMATIVE ASSESSMENT QUESTIONS

- What attributes did you measure?
- Are there any more ways to compare these objects?
- Why did you decide to measure it this way?
- Which object is heavier (longer, taller, holds more, etc.)? How do you know?

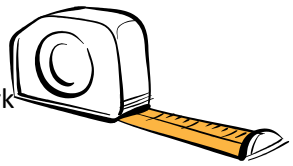
DIFFERENTIATION

Extension

- Students can be encouraged to find objects throughout the room that can be measured with identified attributes or choose another bag to discuss and record observations.

Intervention

- Allow students to work through the stages at a speed that is appropriate for their performance level. Some students may need additional experiences acting out problems, using manipulatives, or drawing pictures.
- Use the chart created during the opening after reading to book to identify attributes that can be compared.



CONSTRUCTING TASK: DOES HOW I MEASURE MATTER?

Approximately 1 day

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

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BACKGROUND KNOWLEDGE

It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attribute being measured.
- It is important that the students realize that BOTH objects must share the attribute before a comparison can be made.
- The lining up of the endpoints for an accurate measurement is important.

ESSENTIAL QUESTIONS

- How can we measure something?
- Does it matter how we measure?
- What qualities of an object can be measured?
- How can I compare 2 objects by their size?
- What does it mean to measure something?
- How can I measure something?
- What ways can I measure this object?
- How can I record my information?

MATERIALS

- Chart paper

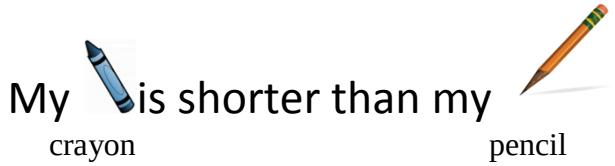
- Bags with 5 items of various length, weight, height and capacity in each bag (examples could include: a box of crayons, a marker, a pencil, a glue stick, paperclip, etc.)

GROUPING

Whole group and small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students together at meeting area and show two items such as a crayon and a pencil. Ask, "Which do you think is longer?" Whisper your answer to your elbow partner. Then share with the class. "Why do you think that? How can we prove that?" Discuss how you decide which is longer. Select two students to demonstrate how you can measure to determine which is longer. Have one student line up the ends of the items and another student place the items side by side but not line up the ends of the items. Ask students, "Why are common endpoints important when comparing length?" Model on chart paper how to write a math statement about the two objects. For example:



crayon pencil

Tell students they are going to explore comparing objects and writing true math statements. Explain that, as a group, they are to compare five objects of varying sizes. Give each group a pre-made bag of items such as books, pencils, crayons, glue sticks, paperclips, etc.

Once they have their bag of objects, they are to lay the objects they have chosen on their table. Students choose 2 items at a time to compare. They should compare the two objects and write a true math statement to describe the comparison of common attributes.

All students in the group do not have to choose the same two objects to compare. Different comparisons between partners will encourage more productive discussions. For example, a pair of scissors may be longer than a paper clip but shorter than a book. Students can have these discussions when deciding where to place the objects on their recording sheet. Again, please note, students are only comparing 2 items at a time.

When students complete their comparisons, let them discuss their findings. Emphasize the importance of aligning endpoints on both objects to compare length. Observe as students compare to make sure they are lining the endpoints up correctly.

Allow students time to share their comparisons. Record these findings on a class chart for later reference. This gives an opportunity to communicate their discoveries in mathematical language. Discuss with the whole group why it DOES matter how you measure.

Teacher reflection questions:

- Are students able to compare objects by their size and explain why this would be important?
- Are students able to use mathematical language to describe the measurement of attributes of items?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?
- Can students explain why we need to have common endpoints when comparing the height or length of two objects?

FORMATIVE ASSESSMENT QUESTIONS

- What attributes did you measure?
- Are there any more ways to compare these objects?
- Why did you decide to measure it this way?
- Which object is heavier (longer, taller, holds more, etc.)? How do you know?
- If I hold the objects like this (without the endpoints lined up), does your math statement change?

DIFFERENTIATION

Extension

- Students can be encouraged to find objects throughout the room that can be measured with identified attributes, or choose another bag to discuss and record observations.
- Encourage students to different comparisons for the same object. For example, the stool is shorter than the door but it is taller than the desk.
- Encourage students to compare different attributes of the same two objects.

Intervention

- Allow students to work through the stages at a speed that is appropriate for their performance level. Some students may need additional experiences acting out problems, using manipulatives, or drawing pictures.
- Give students cards with pictures of different objects. Have the student choose two cards and tell whether one item is longer, shorter, or the same as the other item. The other students can use a "thumbs up" signal if they agree and a "thumbs down" if they don't agree. If the student does not agree, they have to be able to explain their reasoning.
- Put together baggies that have two items in them. Have students compare the items in these bags by making Unifix cube trains for each object and then comparing the length of the trains.
- Draw a line or provide a box with a low lip to help the student line up the endpoints.
- Provide the student with copies of "Does How I Measure Matter? recording sheet and copies of cut outs. The student can use these pictures and math statements to scaffold their learning.

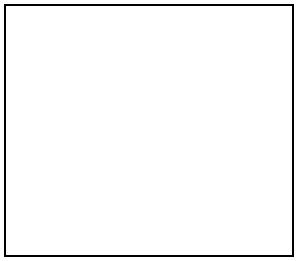
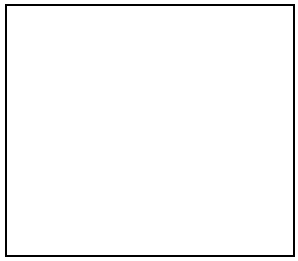
ADDITIONAL RESOURCES:

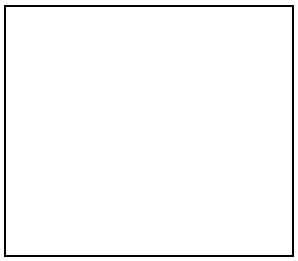
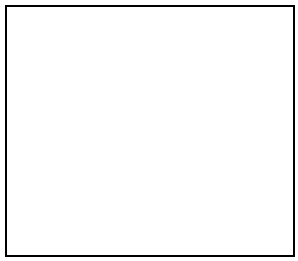
NCTM: Navigation Series – Navigating through Measurement in Pre-kindergarten – Grade 2 String Lengths: p. 18 -20

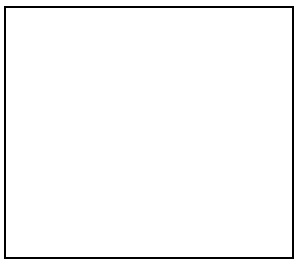
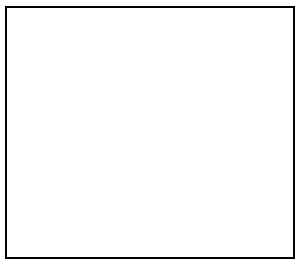
Illuminations: Ladybug Lengths (http://illunimations.nctm.org/LessonDetail.aspx?id+L123

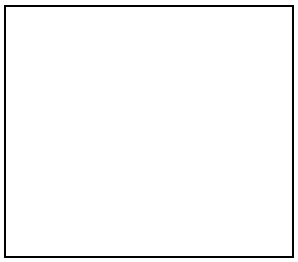
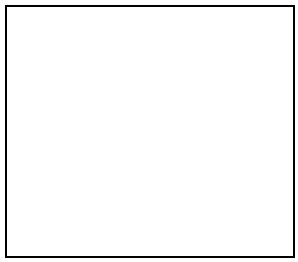
Name_____

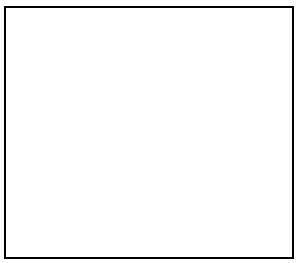
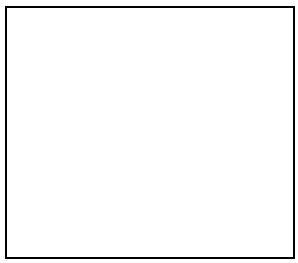
Does How I Measure Matter?

1. A  is longer than a  .

2. A  is shorter than a  .

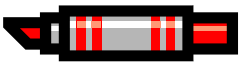
3. A  is the same length as a  .

4. A  is shorter than a  .

5. A  is longer than a  .

Does How I Measure Matter?

Directions: Cut out the pictures below and place them in the boxes to make correct comparisons.

 Crayon	 marker	 glue stick	 pencil	 scissors
 paperclip	 crayon	 marker	 glue stick	 pencil
 scissors	 paperclip	 crayon	 marker	 glue stick
		 paperclip	 crayon	 crayon

pencil 	scissors 			 marker
 glue stick	 pencil	 scissors	 paperclip	

PRACTICE TASK: RIBBON WAR

Approximately 2 days

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Some students may believe that the lining up of end points (placing the ends of objects next to each other) for comparison is not important. These students will also think that a 3 inch block is longer than an 5 inch block when they are lined up like:

3 inch block

5 inch block

ESSENTIAL QUESTIONS

- How can I compare 2 objects by their size?
- How can I measure something?
- What qualities of an object can be measured?
- How can I organize my information?

MATERIALS

- The Best Bug Parade by Stuart J. Murphy or a similar book
- One bag of ribbons or string, cut in various lengths, per pair of students

GROUPING

Whole group and partner task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

The teacher should collect one bag of ribbons or string, cut in various lengths, per pair of students. The lengths should range from about an inch to 24 inches.

Have students go to the meeting area and begin by reading a book on size comparisons such as The Best Bug Parade by Stuart Murphy or a similar book. After reading the book, the teacher will model the Ribbon War described below by showing the students how you and a partner play this game. Demonstrate with a volunteer student taking turns and how to lay the ribbons, side by side, to determine the length. The teacher should observe partners as they make their comparisons. Listen for the use of correct vocabulary (length, taller, shorter, longer, more, less, first, second). As the students make their ribbon comparisons, be sure students are using end-points when they compare the lengths of the ribbons.
Students need to be grouped with partners for this task. The teacher should provide each pair of students with a bag of ribbons.
Students need to be grouped with partners for this task. The teacher should provide each pair of students with a bag of ribbons.

Ribbon War Game

- Reach in the bag and take a piece of ribbon. Lay the ribbon out in a straight line, making sure that it is flat or holding it down to make it flat.
- Your partner will pull a piece out of the bag and lay their ribbon beside your piece. Compare your two ribbons. The partner with the longer ribbon will keep both pieces of ribbon. Observe to make sure students lay the ribbons next to one another (use common end points.)
- If the pieces are the same length, partners pull another piece and add it to the piece that they have already. Compare the two new lengths. The partner with the longer length will keep all the pieces of ribbon.
- Continue playing the game and taking turns until the bag is empty. Count up the total number of ribbons each player has. The winner is the person who has more ribbons.
- Each player then lays out all his/her ribbons in a straight line and compares the total length. Who has the longer total length? Discuss this with your partner.
- The next time you play this game the rules change. Put all ribbons back into the bag and play the game again, but see who has the shorter ribbon. The partner with the shorter ribbon takes both. Again, the partner who has more ribbons is the winner. Make sure to ask students, "What was different about the results this time compared to last time?"

After allowing an appropriate amount of time to play the game, bring students together. Have each set of partners pull two ribbons from their bag and have them identify which is longer and which is shorter and explain their reasoning.

Next, facilitate a class discussion involving a scenario where a student has one ribbon and his partner has 3 ribbons and the one ribbon is longer than the three ribbons. Teacher may need to have an example ready to show, such as 3 ribbons are longer than 5 ribbons.

Teacher reflection questions:

- Are students able to compare objects by their size and explain why this would be important?
- Are students able to use mathematical language to describe the measurement of attributes of items?
- Are students able to explain why end points are important?

FORMATIVE ASSESSMENT QUESTIONS

- If I hold the objects like this (without the endpoints lined up), does your math statement change?
- Did the person who has the most ribbons also have the longer length? Could a person have fewer pieces of ribbon but have a longer line? Why or why not?
- How do you know which ribbon is shorter? Longer?
- Why do we need to line the ribbons up end-to-end to compare the lengths?
- I wonder why end points are important. Can you tell me?

DIFFERENTIATION

Extension

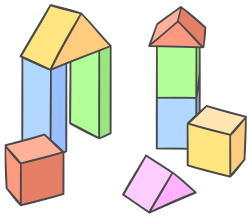
- Prepare baskets of various items (blocks, strips of paper, small boxes, crayons) that can be used to play "Ribbon War." At the end of the game have the students order the items by length. Students draw pictures in their Math Journals to show how they ordered the items.

Intervention

- Provide students with a piece of ribbon and ask them to locate items in the classroom that are longer than the piece of ribbon, as well as shorter than the piece of ribbon. Focus on the discussion of the "why" the item is longer or shorter than the ribbon.

ADDITIONAL RESOURCES:

Van de Walle (2006) Teaching Student-Centered Mathematics Grades K-3, Crooked Paths: p. 229



PRACTICE TASK: COMPARING TOWERS

Approximately 1 day

This lesson is adapted from "Comparing Towers" found at K-5_MathTeachingResources.com

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Kindergarten students need many opportunities to compare attributes of items to determine which is longer or shorter etc. This work is with direct comparison only. Students should use terms such as longer and shorter when comparing towers. Students should not be using a ruler or any standard units of measurement to make comparisons.

ESSENTIAL QUESTIONS

- What qualities of an object can be measured?
- How can I compare 2 objects by their height?
- What does it mean to measure something?
- Why do we need to line the objects up end-to-end?

MATERIALS

- A container with different numbers of connecting cubes such as 5 red cubes and 7 blue cubes for each pair of students.

GROUPING

Whole group and partner task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

At the meeting area, model the Comparing Towers task described below by showing the students how you and a partner work together. Demonstrate with a student how to take turns and how to use the blocks of one color to build a tower. The student should use the blocks of the other color to build a tower. The teacher and student should hold the two towers end-to-end, to determine which one is longer. The teacher should observe partners as they make their comparisons. Listen for the use of correct vocabulary (length, taller, shorter, longer, more, less, first, second). Encourage the students to use numbers to describe how many cubes make up their tower. As the students make their comparisons, be sure students are using end-points when they compare the lengths of the towers.

Students need to be grouped with partners for this task. Next have each set of partners, come to the front and select a container of cubes. Each student should use the cubes of one color from the container to build a tower. The partners should discuss what attributes can be measured when comparing the two towers. Discuss whose tower is longer or shorter, heavier or lighter, darker in color or lighter in color, more cubes or fewer cubes. Use pictures or words to show your work. The teachers should circulate around the room and ask questions about the items to guide students thinking. For example, "Which tower is longer? Which tower is shorter? How did you know?" Partners should record their observations about the attributes of the two towers. Have the students repeat this process with other student's towers (one pair of students could join another pair) Students may begin comparisons of multiple towers at once. This is a great time to help clarify comparisons.

After allowing an appropriate amount of time to complete the task, bring students together. Have each set of partners share their towers and have them identify which attribute was measured, how many cubes were used to make the tower and explain their reasoning.

Teacher reflection questions:

- Are students able to compare objects by their size and explain why this would be important?
- Are students able to use mathematical language to describe the measurement of attributes of items?

FORMATIVE ASSESSMENT QUESTIONS

- Is this task similar to other tasks we have done? How?
- Does holding the towers end-to-end affect the answer? Is this important?
- What attributes did you measure?
- Are there any more ways to compare these objects?
- Why did you decide to measure it this way?
- Which object is heavier (longer, taller, holds more, etc.)? How do you know?

- What does it mean to measure something?
- How can you organize your information so that someone else can understand it?

DIFFERENTIATION

Extension

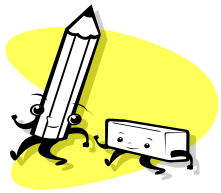
- Prepare baskets of various items (blocks, strips of paper, small boxes, crayons) that can be used for comparison of length. Have the students order the items by length. Students draw pictures in their Math Journals to show how they ordered the items.

Intervention

- Provide students with a tower of connecting cubes and ask them to locate items in the classroom that are shorter than the tower, as well as longer than the tower. Focus on the discussion of the "why" the item is longer or shorter than the tower.

ADDITIONAL RESOURCES:

Van de Walle (2006) Teaching Student-Centered Mathematics Grades K-3, Length Hunt: p. 229



CONSTRUCTING TASK: SHORTER OR LONGER?

Approximately 1 day *(Adapted from "Is it Shorter" found at K-5_MathTeachingResources.com)*

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

An important part of measuring is identifying the unit of measurement. Always have the child state that the objects in the room are being compared to the "tower of 10 cubes". This is the "unit of measurement" for this task. Do not accept statements such as, "Mine is longer" or "This is shorter than that".

ESSENTIAL QUESTIONS

- Is it important to identify what you are using to make the comparison?
- Does it matter how we measure?
- How can I compare 2 objects by their size?
- How can I record my information?

MATERIALS

- Containers with 10 connecting cubes

GROUPING

Individuals

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

The teacher should have 10 connecting cubes, per student. Have students go to the meeting area and model the Shorter or Longer task described below by showing the students how you complete the task. Model your thinking as you make the comparisons and what attribute you are measuring. Stress the importance of identifying what unit (a tower of 10 cubes) is being used to make the comparison.

Have each student get a set of 10 of cubes. The students should join the connecting cubes in their container to make a tower. Find some objects in the classroom that are shorter than your tower of ten cubes and some objects that are longer than your tower of 10 cubes. Use pictures or words to show your work. The teacher should circulate around the room and observe individuals as they make their comparisons and ask the engaging questions. Listen for the use of correct vocabulary (length, taller, shorter, longer, more, less). As the students make their comparisons, be sure students are using end-points when they compare lengths. Partners should record what objects in the classroom are shorter than their tower and how they know this to be true.

After allowing an appropriate amount of time to complete the task, bring students together. Have students share and discuss their work. Have them identify objects that are shorter and explain their reasoning. Use a different unit (larger or smaller tower of cubes) to show why the identification of the unit is importance and how it can make a difference.

Teacher reflection questions:

- Are students able to compare objects by their size and explain why this would be important?
- Are students able to use mathematical language to describe the measurement of attributes of items?

FORMATIVE ASSESSMENT QUESTIONS

- What unit did you use to make the comparison?
- Is this task similar to other task we have done? How?
- Does holding the objects end-to-end affect the answer? Is this important?
- What attributes did you measure?
- Which object is heavier (longer, taller, holds more, etc.)? How do you know?
- How can you organize your information so that someone else can understand it?

DIFFERENTIATION

Extension

- Give the student a different object (marker, pencil, crayon) and have them find some objects in the classroom that are shorter than their object.

Intervention

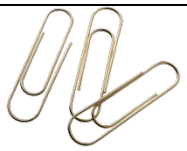
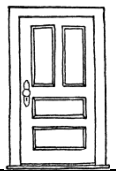
- Give the student a recording sheet, such as "Shorter or Longer", with specified objects around the classroom that should be compared to their tower of cubes. Have focused conversations with the student about how to compare two objects and why one is taller/shorter than the other.

ADDITIONAL RESOURCES:

Van de Walle (2006) Teaching Student-Centered Mathematics Grades K-3, Longer, Shorter, Same: p. 228

Name_____

Shorter or Longer?

1. My tower of 10 is	shorter than longer than	
2. My tower of 10 is	shorter than longer than	
3. My tower of 10 is	shorter than longer than	
4. My tower of 10 is	shorter than longer than	
5. My tower of 10 is	shorter than longer than	
6. My tower of 10 is	shorter than longer than	
7. My tower of 10 is	shorter than longer than	
8. My tower of 10 is	shorter than longer than	

PRACTICE TASK: TALLER THAN A TOWER OF TEN?

Approximately 2 days

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attribute being measured.
- It is important that the students realize that BOTH objects must share the attribute before a comparison can be made.
- The lining up of the endpoints for an accurate measurement is important.
- Identifying the unit of measurement is essential to sharing your comparison with others

ESSENTIAL QUESTIONS

- Does it matter how we measure?
- What qualities of an object can be measured?
- How can I compare 2 objects by their size?
- How can I record my information?

MATERIALS

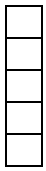
- Box of objects taller, shorter, and the same height as a tower of ten blocks and a tower of five blocks
- Unifix cubes or connecting cubes
- Math Journal to record observations and thoughts

GROUPING

Whole group and partners

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I – Benchmark of 5
Gather students together at meeting area and show them a tower of 5 and a tower of 10. Explain that we can compare objects length using a tower of 5 or a tower of 10 cubes. Hold up an object that is the same height as a 5 tower or a 10 tower and ask, "Is this object taller than, shorter than, or the same as my tower? Whisper your answer to your elbow partner. Then share with the class. "Why do you think that?" Model writing a true math statement about your comparison. For example,

My  is the same height as my 

tower of 5 box

Tell students they are going to explore comparing objects and writing true math statements. Explain that, as a group, they are to compare five objects of varying sizes to their tower of 5. Give each group a pre-made bag of items such as books, pencils, crayons, glue sticks, paperclips, etc. making sure that each bag has at least one item that is the same as a tower of 5.

Have each child in the group, select an object and do the comparison. Listen to how they are using the vocabulary taller, shorter and same height. They should record their observation in their math journal and write a true math statement. Continue this lesson, allowing them to explore different objects and comparing them to their tower of five. Students can draw pictures to show their answer and record their thinking.

To close, gather students together on meeting area and have them share and discuss their mathematical thinking along with their true math statements.

Part II – Benchmark of 10

This should be completed the next day.

Tell the students "Today we are using a benchmark of 10." Do you think our comparisons will change? Why or why not?"

Have the students build their own tower of ten cubes and count the cubes orally so you can observe them counting the cubes. Next, show the students the box of objects from yesterday. Ask them to select one object from the box and discuss how the tower of blocks is shorter, longer, and or same height as the object you selected. Listen to how they are using the vocabulary taller, shorter and the same height. Continue this task, allowing them to explore different objects and comparing them to their tower of ten and recording their mathematical thinking in their journals.

To provide closure for the task, gather students together in meeting area and have them share and discuss their mathematical thinking along with their true math statements.

Teacher reflection questions:

- Are students able to compare objects by their size and explain why this would be important?
- Can students explain why their comparisons are correct?
- Are students able to use mathematical language to describe the measurement of attributes of items?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?
- Can students explain why we need to have common endpoints when comparing the height or length of two objects?

FORMATIVE ASSESSMENT QUESTIONS

- What attributes did you measure?
- What unit did you use to measure it?
- How do you know your comparisons are correct?
- Why are these items longer, shorter, or the same as your tower?
- Are there any more ways to compare these objects?
- Why did you decide to measure it this way?
- Which object is heavier (longer, taller, holds more, etc.)? How do you know?
- If I hold the objects like this (without the endpoints lined up), does your math statement change?

DIFFERENTIATION

Extension

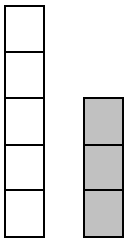
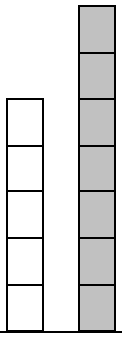
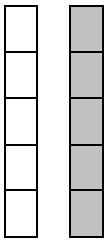
- Students can be encouraged to find objects throughout the room that are the same size as their tower of 5 or tower of 10.

Intervention

- Allow students to work through the stages at a speed that is appropriate for their performance level. Some students may need additional experiences acting out problems, using manipulatives, or drawing pictures.
- Increase the size difference of the objects making it more obvious which one is taller/shorter, etc.
- Put together baggies that have only two items in them instead of 5.
- Draw a line or provide a box with a low lip to help the student line up the endpoints.
- Provide the student with copies of "Tower of 5" and "Tower of 10" recording sheets. The student can use these recording sheets to scaffold their learning.

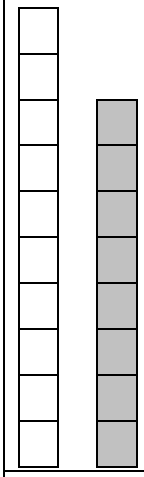
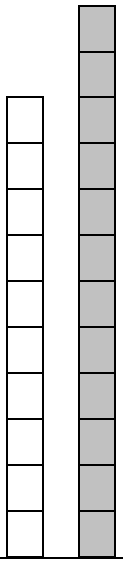
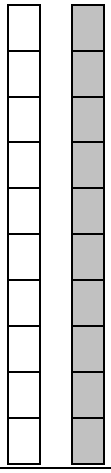
Name_____

Tower of Five

Shorter	Taller	Same
		
Draw a picture of an object that is **shorter** than 5 cubes.	Draw a picture of an object that is **taller** than 5 cubes.	Draw a picture of an object that is the **same** as 5 cubes.

Name_____

Tower of Ten

Shorter	Taller	Same
		
Draw a picture of an object that is **shorter** than 10 cubes.	Draw a picture of an object that is **taller** than 10 cubes.	Draw a picture of an object that is the **same** as 10 cubes.

PRACTICE TASK: RUMPLESTILTSKIN IS MY NAME

Approximately 2 days

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attribute being measured.
- It is important that the students realize that BOTH objects must share the attribute before a comparison can be made.
- The lining up of the endpoints for an accurate measurement is important.

ESSENTIAL QUESTIONS

- How can we measure something?
- Does it matter how we measure?
- What qualities of an object can be measured?
- How can I compare 2 objects by their size?
- What does it mean to measure something?
- How can I measure something?
- What ways can I measure this object?
- How can I record my information?

MATERIALS

- Index cards
- Unifix cubes
- Chrysanthemum by Kevin Henkes or a similar book
- Chart paper

GROUPING

Small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I
At the meeting area, have students brainstorm a list of the longest words they know. After brainstorming long words, choose 2-3 words to write on the board. Lead a discussion on the length of the words. Have volunteers help create a "word rod" to represent the length of each word. For example, use Unifix cubes and have one block represent each letter in the word. Tell students "We've talked about some really long words. I have a story about a little girl who has a really long name. Listen for the different names as I read the story." Read Chrysanthemum by Kevin Henkes, or a similar book. Select one student to pick two of the names in the story. Write these two names on individual index cards. Talk about which is longer and shorter and how you know. Then, model how to represent the name length with cubes. Compare the two names to determine which name is shorter and which name is longer. Repeat this process with several more pairs of names from the story…**but compare ONLY 2 names at a time**.

Explain to the students that they will write their name on an index card and then count out the number of Unifix cubes to build a matching "name rod." Explain that they will be deciding whose names are shorter, longer, or the same length as their own name and recording this information in their Math Journals.

Put students into groups of 4 to 6 for this task. Students will compare "name rods" within their small group to determine whose name was longer, shorter and/or the same name as their own name. **Again, compare ONLY 2 names at a time.**

Bring the class back together to discuss various comparisons. The teacher will lead students in discussion about name towers comparing only two students at a time.

Part II
Re-read the story Chrysanthemum by Kevin Henkes to the students. Select a name from the story and compare the length of the name to a student in the class to determine which name is longer and which name is shorter. Repeat this process with several students, but ONLY compare 2 names at a time.

After students create "name rods" to represent their name, have them gather in a circle. Choose one student to come to the center of the circle as the student leader. Have the student in the center ask their classmates, "Who has a name longer than mine?" Students, who think their name is longer, will stand so the student can compare with each individual student tower. This can be repeated with the same student, but this time using the shorter than comparison. Game continues with various students taking the lead role in comparisons. The teacher should allow student leader to ask questions and verbalize their thinking.

Allow students time to share their comparisons. Record these findings on a class chart for later reference. This gives an opportunity to communicate their discoveries in mathematical language. Discuss with the whole group what steps were needed to measure.

Teacher reflection questions:

- Can students tell why it is important to be able to compare the length of 2 objects?
- Are students able to compare objects by their size and explain why this would be important?
- Are students able to use mathematical language to describe the measurement of attributes of items?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?
- Can students explain why we need to have common endpoints when comparing the height or length of two objects?

FORMATIVE ASSESSMENT QUESTIONS

- What attribute did you measure?
- Why did you decide to measure it this way?
- Which object is heavier (longer, taller, holds more, etc.)? How do you know?
- If I hold the objects like this (without the endpoints lined up), does your math statement change?

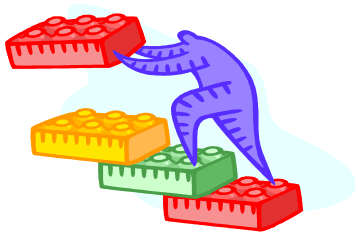
DIFFERENTIATION

Extension

- Write additional words on index cards. If there are labels in the room identifying objects, students may want to copy those words. Example: door, bookshelf, calendar, clock, cubbies, etc. Have students make towers with the same number of cubes as letters in the word to go with the words. Have students use their Math Journals to write the longer words, shorter words, or words that are the same as their name.

Intervention

- Allow students to work through the stages at a speed that is appropriate for their performance level. Some students may need additional experiences acting out problems, using manipulatives, or drawing pictures.
- If necessary, provide these students with Unifix cubes that have letter stickers on them that spell their name or allow students to write the letters on the Unifix cubes using a dry erase marker or wax pencil. They will use this to make the connection between their name and the blank Unifix cubes. Look for possible misconceptions and note correct usage of vocabulary terms.



CONSTRUCTING TASK: WHICH IS LONGER?

Approximately 1 day
This lesson is adapted from "Which Is Longer" found at K-5_MathTeachingResources.com

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Kindergarten students need to learn that when measuring multiple objects as one unit, the objects must be lined up end to end in order to get an accurate measurement. If gaps are left between objects, it changes the measurement or comparison. It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attribute being measured.
- It is important that the students realize that BOTH objects must share the attribute before a comparison can be made.
- The lining up end-to-end is important for an accurate measurement.

ESSENTIAL QUESTIONS

- If I have the same number of objects, why is one set longer than the other set?
- Why is it important to lay the objects end-to-end?
- What qualities of an object can be measured?
- How can I compare 2 sets of objects?
- What ways can I measure this object?
- How can I record my information?

MATERIALS

- Connecting cubes
- Paper clips
- Counters
- Pattern blocks
- Other items for measurement

GROUPING

Individual

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students together at meeting area and show two sets of items such as 8 crayons and 8 pencils. Ask, "If I lay these sets of objects end-to-end, which do you think is longer?" Whisper your answer to your elbow partner. Then share with the class. "Why do you think that? How can we prove that?" Discuss how you decide which set is longer. Select two students to demonstrate how you can measure to determine which is longer. Have a student line up the items end-to-end and remind them of the importance of common endpoints for each line. Ask students, "Why is it important to line items up end-to-end when comparing length of a set?" Model on a chart how to write a math statement about the two objects. For example:

My 8  are shorter than my 8 

crayons pencils

Tell students they are going to explore comparing sets of objects and writing true math statements. Give each group pre-made bags of items such as 20 connecting cubes and 20 paper clips, 7 crayons and 7 counters, 12 square pattern blocks and 12 trapezoid pattern blocks and 10 craft sticks and 10 dominoes.

Once they have their bags of objects, they are to lay the objects end-to-end on their table (creating 2 lines with each lining containing alike objects). They should compare the two sets of objects and write a true math statement to describe the comparison of common attributes. Then switch bags with a peer in their small group to make a new comparison. Again, please note students are only comparing 2 items at a time. Emphasize the importance of aligning endpoints on both lines of objects to compare length. Observe as students compare to make sure they are lining the endpoints up correctly.

Allow students time to share their comparisons. This gives an opportunity to communicate their discoveries in mathematical language. Discuss with the whole group why it DOES matter how you measure.
Teacher reflection questions:

- Are students able to compare sets of objects and explain why this would be important?
- Can students explain why we need to line objects up end-to-end in order to accurately measure sets?
- Are students able to use mathematical language to describe the measurement of attributes of items?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?
- Can students explain why we need to have common endpoints when comparing the height or length of two objects?

FORMATIVE ASSESSMENT QUESTIONS

- Why is this set longer/shorter when we have the same number of items as this set?
- What attributes did you measure?
- Which object is heavier (longer, taller, holds more, etc.)? How do you know?
- If I hold the objects like this (without the endpoints lined up), does your math statement change?

DIFFERENTIATION

Extension

- Prepare baggies of sets of items of different quantities. For example: 10 connecting cubes and 20 paper clips, 7 crayons and 15 counters, 5 craft sticks and 15 dominoes, etc. that can be used for comparison of length of sets. Have the students order the items end-to-end and compare the lengths. Students draw pictures in their Math Journals to show how they compared the items.

Intervention

- *Have pre-made cards of items such as 20 connecting cubes and 20 paper clips, 7 crayons and 7 counters, and 10 craft sticks and 10 dominoes glued down. Have the child make comparisons of the length of each line.*

CONSTRUCTING TASK: USING A BALANCE SCALE

Approximately 1 day

This lesson is adapted from "Using a Balance Scale" found at K-5_MathTeachingResources.com

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Kindergarten students most likely will have no prior knowledge of using a balance scale. You may want to discuss with them that when something heavy is placed in our hand, our hand drops down from the weight. Then discuss that on a balance scale, the heavier an object is, the lower that side of the scale drops. Objects have multiple measureable attributes. Remind the students that it is important to identify the attribute being measured. Remember:

- It is important that the students clearly identify the attribute being measured.
- It is important that the students realize that BOTH objects must share the attribute before a comparison can be made.

ESSENTIAL QUESTIONS

- Does it matter how we measure?
- When two objects are similar, how do we KNOW that we are correct with our comparison?
- What qualities of an object can be measured?
- How can I record my information?

MATERIALS

- Balance scales
- Items of various weights (examples could include: a box of crayons, a marker, a pencil, a glue stick, paperclip, etc.)

GROUPING

Whole group and small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students together at meeting area and explain that today we are learning how a balance scale works and comparing objects to see which one is heavier or lighter. Demonstrate how the balance scale is even when each side has the same amount of weight. When you place a heavier object on one of the sides the heavier of the two objects will sinks down lower than the other side. Demonstrate this with several different objects. Discuss with the students that we do not always need a balance scale to help us tell if an object is heavier or lighter than another object, but when the objects are close to the same weight it helps us know that our answer is correct.

My  is heavier than my 
crayon pencil

My  weigh less than my 
scissors shoe

Tell students they are going to explore comparing objects and writing true math statements. Explain that, as a group, they are to compare five objects of varying weights. Give each group a pre-made bag of items such as books, pencils, crayons, glue sticks, paperclips, etc.

Once they have their bag of objects, they are to lay the objects they have chosen on their table. Students choose 2 items at a time to compare. They should compare the two objects and write a true math statement to describe the comparison of common attributes. They decide if it is necessary to use the balance scale to prove their statement.

All students in the group do not have to choose the same two objects to compare. Different comparisons between partners will encourage more productive discussions. For example, a pair of

scissors may be heavier than a paperclip but lighter than a book. Students can have these discussions when writing their math sentences. Again, please note students are only comparing 2 items at a time. When students complete their comparisons, let them discuss their findings.

Allow students time to share their comparisons. Record these findings on the *Using a Balance Scale* recording sheet. This gives an opportunity to communicate their discoveries in mathematical language. Discuss with the whole group why it DOES matter how you measure.

Teacher reflection questions:

- Are students able to determine which item is heavier/lighter than another?
- Are students able to compare objects by their size and explain why this would be important?
- Are students able to use mathematical language to describe the measurement of attributes of items?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?
- Can students explain why we need to have common endpoints when comparing the height or length of two objects?

FORMATIVE ASSESSMENT QUESTIONS

- Why do we need a balance scale?
- What attributes did you measure?
- Are there any other ways to compare these objects?
- Why did you decide to measure it this way?
- Which object is heavier? How do you know?

DIFFERENTIATION

Extension

- Students can be encouraged to find objects throughout the room that can be measured with identified attributes or choose another bag to discuss and record observations.
- Encourage students to compare different attributes of the same two objects.

Intervention

- Allow students to work through the stages at a speed that is appropriate for their performance level. Some students may need additional experiences acting out problems, using manipulatives, or drawing pictures.
- Put together baggies that have only two items in them and items are significantly different in weight.
- Allow additional time with balance scales. To begin, have them concentrate on items that weigh the same so they can practice getting things balanced.

Using a Balancing Scale

Name:_____

My…	Weighs less than 	My…
My…	Weighs more than 	My…
My…	Weighs less than 	My…
My…	Weighs more than 	My…

My…	Weighs less than 	My…

PRACTICE TASK: HOW HEAVY IS IT?

Approximately 1 day

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attribute being measured.
- It is important that the students realize that BOTH objects must share the attribute before a comparison can be made.

ESSENTIAL QUESTIONS

- What attribute are we measuring?
- Does it matter how we measure?
- How can I compare 2 objects by their weight?
- How can I record my information?

MATERIALS

- Mighty Maddie by Stuart Murphy or a similar book
- Balance scales for each small group
- Common objects to weigh on the balance scales- such as a CD, marker, glue stick, paper clip, pencil, pack of Post-It Notes, marble, golf ball, tennis ball, etc.

GROUPING

Whole group and small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I
Gather students in meeting area and say, "There are lots of ways to measure items. We have talked about longer, shorter, or the same length. What are other ways we can measure?" Record student responses on a class chart. "If I wanted to pick something up, what would I want to know about what I was going to lift?" (How heavy it is…how much it weighs.)

Read a book such Mighty Maddie by Stuart Murphy or similar book. Show real examples of scales. Discuss where they see these in the real world such as the grocery store, the doctor's office, and the bathroom. Discuss how scales can be used to find the weight of objects and balance is like a seesaw. Balance Scales can be used to compare two objects to see which one weighs more. Help students develop the concept of weight by holding several objects such as a tennis ball and a golf ball or a marble and a tennis ball (both are spheres) in their hands. Then compare the weights when they are placed in the scale. Be sure to use the terms heavier and lighter. Model on a chart how to write a math statement about the two objects. For example:

My  is heavier than my  .
crayon pencil

Tell students they are going to explore comparing objects and writing true math statements. Explain that, as a group, they are to compare five objects of varying sizes. Give each group a pre-made bag of items such as books, pencils, crayons, glue sticks, paperclips, CD, marker, glue stick, paper clip, pencil, pack of Post-It Notes, marble, golf ball, tennis ball, etc.

Once they have their bag of objects, they are to lay the objects on their table. Students choose 2 items at a time to compare. They should compare the two objects simply by holding them in their hands. If the objects are too similar to compare accurately in your hands, then they should use the balance scale. Each student should record his/her math thinking by writing a true math statement to describe the comparison of common attributes.

All students in the group do not have to choose the same two objects to compare. Different comparisons between partners will encourage more productive discussions. For example, a marble may be heavier than a paperclip but lighter than a book. Students can have these discussions when writing their math sentences. Again, please note students are only comparing 2 items at a time. When students complete their comparisons, let them discuss their findings.

Allow students time to share their comparisons. Record these findings on a class chart for later reference. This gives an opportunity to communicate their discoveries in mathematical language. Discuss that choosing when to use a math tool is important.

Teacher reflection questions:

- Are students able to compare objects by their size and explain why this would be important?
- Are students able to determine which item is heavier/lighter than another?
- Are students able to use mathematical language to describe the measurement of attributes of items?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?
- Can students explain why we need to have common endpoints when comparing the height or length of two objects?

FORMATIVE ASSESSMENT QUESTIONS

- What attribute did you measure?
- Are there any more ways to compare these objects?
- Why did you decide to measure it this way?
- Which object is heavier (longer, taller, holds more, etc.)? How do you know?

DIFFERENTIATION

Extension

- Students can be encouraged to find objects throughout the room that can be measured with identified attributes or choose another bag to discuss and record observations.
- Encourage students to compare different attributes of the same two objects.

Intervention

- Allow students to work through the stages at a speed that is appropriate for their performance level. Some students may need additional experiences acting out problems, using manipulatives, or drawing pictures.
- Put together baggies that have only two items in them which are significantly different in weight.
- Allow additional time with balance scales. To begin, have them concentrate on items that weigh the same so they can practice getting things balanced.
- Provide the student with copies of a recording sheet to help organize their thinking. See the "How Heavy Is It" example page.

ADDITIONAL RESOURCES:

NCTM: Navigation Series – Navigating through Measurement in Pre-kindergarten - Grade 2 Body Balance: p.14 -15

How Heavy Is It?

Name: _____

Have the student draw representations of the objects being compared and circle the correct measurement term.

	is heavier than is lighter than	
	is heavier than is lighter than	
	is heavier than is lighter than	
	is heavier than is lighter than	
	is heavier than is lighter than	
	is heavier than is lighter than	
	is heavier than is lighter than	

CONSTRUCTING TASK: ORDERING CONTAINERS

Approximately 1 day

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Introducing capacity (how much something can hold) can be tricky with kindergarten students. You will want to consider the skill of conservation when working with capacity. Some students may need extra guidance with understanding how different shaped objects can hold more or less. You may want to set up a water investigation station to let the students explore different types of containers and how much they hold. You will also want to reinforce the identification of the unit of measurement. It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attribute being measured.
- It is important that the students realize that BOTH objects must share the attribute before a comparison can be made.
- Keeping a careful count of how much of the substance it takes to fill an object is important.

ESSENTIAL QUESTIONS

- Does it matter how we measure?
- What does it mean to measure something?
- What ways can I measure this object?
- How can I record my information?

MATERIALS

- A variety of containers (at least 10 containers per group) Example: small boxes, cups, bowls, bottles, etc.
- Substances to fill containers: beans, sand, water, rice
- Funnel

GROUPING

Whole group and small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students on meeting area. Show the students two containers; examples could include: a coffee cup and a gallon jug. Pose this question, "Which holds more liquid?" Allow various students to respond. Include "How do you know?" questions. Use a substance to fill the one of the containers and then pour the substance into the other container to determine if it would hold more, less, or the same amount. Model on a chart how to write a math statement about the two objects. For example:

My  holds more than my  .
milk jug coffee cup

Show the students that you have many different sizes of containers for each group. Have students make estimates about which container holds more and which container holds less. Allow children to use a substance (sand, water, rice, beans, etc.) to fill the containers. Discuss which container holds the most, or the least. The students should use their Math Journals to write true math statements about the comparisons.

All students in the group do not have to choose the same two objects to compare. Different comparisons between partners will encourage more productive discussions. For example, a coffee cup may hold less than a pitcher but more than a lid. Students can have these discussions when writing their math statements. Again, please note students are only comparing 2 items at a time.

When students complete their comparisons, let them discuss their findings. Emphasize the importance of aligning endpoints on both objects to compare length. Observe as students compare to make sure they are accurately filling the containers.

Allow students time to share their comparisons. Record these findings on a class chart for later reference. This gives an opportunity to communicate their discoveries in mathematical language. Discuss with the whole group why it DOES matter how you measure.

Teacher reflection questions:

- Are students able to determine which items hold more or less than others?
- Are students able to compare objects by their size and explain why this would be important?
- Are students able to use mathematical language to describe the measurement of attributes of items?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?

FORMATIVE ASSESSMENT QUESTIONS

- What attributes did you measure?
- Are there any more ways to compare these objects?
- Why did you decide to measure it this way?
- Which object holds more (longer, taller, heavier, etc.)? How do you know?
- If I fill one container with beans and the other container with water, can I still compare how much they hold? Why or why not?

DIFFERENTIATION

Extension

- Provide the student with other container to discuss and record observations.
- Encourage students to compare different attributes of the same two objects.

Intervention

- Have students pour the material into two identical containers so they can compare which holds more/less. This direct comparison will assist them in seeing the comparisons more clearly.
- Provide the student with copies of a recording sheet to help organize their thinking. See the "Ordering Container" example page.

ADDITIONAL RESOURCES:

Van de Walle (2006) Teaching Student-Centered Mathematics Grades K-3, Capacity Sort: p. 238

Ordering Containers

Name: _____

Have the student draw representations of the objects being compared and circle the correct measurement term.

	holds more than holds less than	
	holds more than holds less than	
	holds more than holds less than	
	holds more than holds less than	
	holds more than holds less than	
	holds more than holds less than	
	holds more than holds less than	

PRACTICE TASK: COMPARING CONTAINERS

Approximately 1 day

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

In this task, students will be using various size containers. Remember, students only compare two at a time, so when selecting the two containers to be compared be sure it is easy to determine which holds more or less. You will also want to discuss that different qualities of an object (wider, taller, etc) affect how much it can hold. It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attribute being measured.
- It is important that the students realize that BOTH objects must share the attribute before a comparison can be made.
- Keeping a careful count of how much of the substance it takes to fill an object is important.

ESSENTIAL QUESTIONS

- Does it matter how we measure?
- What qualities of an object do we have to consider when measuring capacity?
- How can I compare 2 objects by their size?
- What ways can I measure this object?
- How can I record my information?

MATERIALS

- A variety of containers (at least 10 containers per group) Example: small boxes, cups, bowls, bottles, etc.
- Items for the children to choose from to fill the containers. For example: plastic eggs, tennis balls, golf balls, wads of paper (make them about the same size)

GROUPING

Whole group and small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students on meeting area. Show the students two containers; examples could include: a coffee cup and a gallon jug. Pose this question, "Which holds more marbles?" Allow various students to respond. Include "How do you know?" questions. Use marbles to fill one of the containers and then pour the substance into the other container to determine if it would hold more, less, or the same amount. Model on a chart how to write a math statement about the two objects. For example:

My  holds more marbles than my  .

plastic cup coffee cup

Show the students that you have many different sizes of containers for each group. Have students make estimates about which container holds more and which container holds less. Allow children to use items (marbles, golf balls, paper wads, etc.) to fill the containers. Discuss which container holds the most, or the least. Discuss why it would not be appropriate to measure the plastic cup and coffee cup with tennis balls. Tell the students that part of being correct in math means choosing the right tool. The students should use their Math Journals to write true math statements about the comparisons making sure that they identify the unit of measurement.

All students in the group do not have to choose the same two objects to compare. Different comparisons between partners will encourage more productive discussions. For example, a coffee cup may less than a pitcher but more than a lid. Students can have these discussions when writing their math statements. Again, please note students are only comparing 2 items at a time.

When students complete their comparisons, let them discuss their findings. Emphasize the importance of aligning endpoints on both objects to compare length. Observe as students compare to make sure they are accurately filling the containers.

Allow students time to share their comparisons. Make sure that the unit of measurement is identified in math statements. This gives an opportunity to communicate their discoveries in mathematical language. Discuss with the whole group why it DOES matter how you measure.
Teacher reflection questions:

- Are students able to identify appropriate units for measurement?
- Are students able to determine which items hold more or less than others?
- Are students able to compare objects by their size and explain why this would be important?
- Are students able to use mathematical language to describe the measurement of attributes of items?

FORMATIVE ASSESSMENT QUESTIONS

- Why did you choose that item to measure how much the containers will hold?
- What attributes did you measure?
- Are there any more ways to compare these objects?
- Why did you decide to measure it this way?
- Which object holds more (longer, taller, heavier, etc.)? How do you know?
- If I fill one container with beans and the other container with water, can I still compare how much they hold? Why or why not?

DIFFERENTIATION

Extension

- Provide the student with other container to discuss and record observations.
- Encourage students to measure the same container with different units of measurement.
- Encourage students to compare different attributes of the same two objects.

Intervention

- Have students pour the material into two identical containers so they can compare which holds more/less. This direct comparison will assist them in seeing the comparisons more clearly.

ADDITIONAL RESOURCES:

Van de Walle (2006) Teaching Student-Centered Mathematics Grades K-3, Capacity Lineup: p. 239

PRACTICE TASK: RIDDLE ME!

Approximately 1 day

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weig measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

In this task, students are placed in a problematic situation with multiple possibilities for correct answers. Remember, students only compare two objects at a time, so it is imperative that you model how to compare the first object in the riddle to the possible correct answer and then the second object in the riddle to the possible correct answer. For example, if the riddle says, I am heavier than a penny, but lighter than a desk. You will need to model suggesting a possible correct answer such as a shoe and then comparing the shoe to the penny and then comparing the shoe to the desk. It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attribute being measured.
- It is important that the students realize that BOTH objects must share the attribute before a comparison can be made.
- Comparing each object in the riddle separately from the possible correct answer.

ESSENTIAL QUESTIONS

- Does it matter how we measure?
- What ways can I measure this object?
- How can I record my information?

MATERIALS

- Riddles for the students to solve. (See attachment at the end of the task)
- Balance scale (optional)
- Items for the children to choose from to fill containers. For example: plastic eggs, tennis balls, golf balls, wads of paper (make them about the same size) (optional)

GROUPING

Individuals or small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students on meeting area. Show the students a riddle for the class to solve together, making sure to model how to compare only two objects at a time. You will also want to model how to think aloud your reasoning for proving that the answer is or is not correct. Explain to the students that they will be given riddles to solve with their partner. They will need to be prepared to share their answers with the class and be prepared to prove that their answer is correct.
Possible class riddles for modeling your thinking:

I am heavier than a  but lighter than a  .
penny desk
What am I?

I am longer than a  but shorter than a  .
sticky note clip board
What am I?

Divide the students into pairs (you may want to consider different abilities for this task and create pairs accordingly) and give each set of students a copy of the "Riddle Me" task page. The students need to discuss with their partner what attributes are being compared and find correct answers in the classroom for the riddles. The teacher should circulate throughout the classroom and ensure that

proper measuring and mathematical conversations are occurring. You will want to consider having a balance scale for the measuring of weight and other manipulatives for the measurement of capacity.

When students complete all (or a majority) of the riddles, allow them time to share their answers. You may want to join partner pairs and have them "prove" to each other that their answers are correct. Make sure that the unit of measurement is identified in verbal math statements. This gives them an opportunity to communicate their discoveries in mathematical language. Discuss with the whole group why it is possible to have more than one correct answer.

Teacher reflection questions:

- Are students able to identify appropriate units for measurement?
- Are students able to determine correctly measure for different attributes?
- Are students able to use mathematical language to describe the measurement of attributes of the items?

FORMATIVE ASSESSMENT QUESTIONS

- What attributes did you measure?
- Are there any more ways to compare these objects?
- Why did you decide to measure it this way?
- Are there other possible correct answers?

DIFFERENTIATION

Extension

- Have the students create riddles for their classmates to answer.

Intervention

- Narrow the selection of possible correct answers by having the student choose from a set of objects the answer to the riddle.

ADDITIONAL RESOURCES:

PBS Kids: Clifford the Big Red Dog: **http://pbskids.org/clifford/games/measuring_up.html**

Riddle Me!

Names of Group Members:

_____

Riddle 1:

I am longer than a  but shorter than a  .

paper clip

piece of paper

What am I?

Riddle 2:

I am heavier than a  but lighter than a  .

CD

laptop

What am I?

Riddle Me! Continued

Riddle 3:

I hold more than a  but less than a  .

coffee cup milk jug

What am I?

Riddle 4:

I bigger than a  but smaller than a  .

crayon book

What am I?

Riddle 5:

I am shorter than a  but longer than a  .

window block

What am I?

Riddle Me! Continued

Riddle 6:

I am lighter than a student but heavier than a.

book

What am I?

Riddle 7:

I hold less than a bathtub but more than a

cup .

What am I?

Riddle 8:

I am smaller than a school bus but bigger than a

shoe .

What am I?

PERFORMANCE TASK: MEASUREMENT OLYMPICS

Approximately 2 days

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Students should have had multiple opportunities comparing and ordering objects based on length, capacity, height, and weight prior to this task. In addition to comparing, students should have experience with describing objects as heavier/lighter, taller/shorter, longer/shorter, and/or more/less. It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attribute being measured.
- It is important that the students realize that BOTH objects must share the attribute before a comparison can be made.
- The lining up of the endpoints for an accurate measurement is important.
- The unit of measurement must be identified

ESSENTIAL QUESTIONS

- How can we measure something?
- Does it matter how we measure?
- What does it mean to measure something?
- What ways can I measure this object?
- How can I record my information?

MATERIALS

- 4 different boxes to hold materials for each event
- Event directions on each box
- Event 1 box: pencil, crayon, marker, spoon, foot ruler, various sizes of cut ribbon etc.
- Event 2 box: various sizes of boxes, containers, blocks etc.
- Event 3 box: Unifix cubes or snapping blocks to build towers
- Event 4 box: balance scale, manipulatives such as counting bears, paper clips, glue sticks, crayons, small toys, various sizes of balls (bouncy ball, playground ball, tennis ball etc.) Anything small enough to put on the balance scale would work.
- A "Olympic Event" student task sheet for each student

GROUPING

Individuals or partners

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students together at meeting area and review the big ideas learned in this unit and about measurement. Explain that today students will demonstrate their understanding of the measurement standards in each of the events in Measurement Olympics. "Olympic Events" will allow the students to demonstrate their mastery of the measurement standards. This task can be done in one classroom or collaboratively within a grade level. The tasks and activities will be grouped as "Events." Students will rotate to all four of the Olympic events. Tell students that they are going show what they know about measurement in the events. The students should directly compare 2 objects that they choose from each station. Have them do this 3 different times, making sure to choose different objects each time. The students will compare and order the objects based upon the measurement attribute given at each station. Review each stations directions.

Students visit each station and record their observations.

Olympic Event Descriptions

Event 1 – Short to Long	Event 2 – How High
Pick two objects from the box. Decide which is shorter and which is longer. Draw the objects on your event sheet in the correct box. Label them using the words shorter and longer.	Use some of the 20 blocks to make 2 different towers that are two different heights. Decide which tower is shorter and which is taller. Label your pictures using these words. Use numerals or words to tell how many blocks you used on each tower. Write those numbers and/or words on your sheet.
Event 3 – How Much Does it Hold?	**Event 4 – Heavy or Lightest**
Pick two objects from the box. Decide which holds more and which holds less. Draw the objects on your sheet and label them using words less and more.	Select two objects from the box. Decide which is lighter and which is heavier. You can use the balance scale to help you make your determinations. Draw a picture on your event sheet and label the heavier and lighter object.

After everyone has collected and recorded their data, allow them to share their findings in small groups or with the whole class.

Teacher reflection questions:

- Are students able to compare objects by their size and explain why this would be important?
- Can students determine which objects are heavier or lighter than others?
- Are students able to use mathematical language to describe the measurement of attributes of items?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?
- Can students explain why we need to have common endpoints when comparing the height or length of two objects?

FORMATIVE ASSESSMENT QUESTIONS

- What attributes did you measure?
- Are there any more ways to compare these objects?
- Why did you decide to measure it this way?
- Which object is heavier (longer, taller, holds more, etc.)? How do you know?
- If I hold the objects like this (without the endpoints lined up), does your math statement change?

DIFFERENTIATION

Extension

- If students are comfortable with the process allow them to back and choose additional items for comparison. Have them record in their Math Journals what they learned from this experience.

Intervention

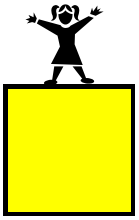
- Allow students to work through the stages at a speed that is appropriate for their performance level. Some students may need additional experiences acting out problems, using manipulatives, or drawing pictures.

Event 1 – Short to Long	Event 2 – How High
Pick two objects from the box. Decide which is shorter and which is longer. Draw the objects on your event sheet in the correct box. Label them using the words shorter and longer.	Use some of the 20 blocks to make 2 different towers that are two different heights. Decide which tower is shorter and which is taller. Label your pictures using these words. Use numerals or words to tell how many blocks you used on each tower. Write those numbers and/or words on your sheet.
Event 3 – How Much Does it Hold?	Event 4 – Heavy or Lightest
Pick two objects from the box. Decide which holds more and which holds less. Draw the objects on your sheet and label them using the words less and more.	Select two objects from the box. Decide which is lighter and which is heavier. You can use the balance scale to help you make your determinations. Draw a picture on your event sheet and label the heavier and lighter object.

Event 1 Short or Long?	Event 2 How Much Does It Hold?
Event 3 How High?	Event 4 Heavy or Light?

Name _____

Event 1 Short or Long?			
Event 2 How much Does It Hold?			
Event 3 How High?			
Event 4 Heavy or Light?			



CONSTRUCTING TASK: SORTING ATTRIBUTE BLOCKS

Approximately 1 day
This lesson is adapted from "Sorting Attribute Blocks" found at K-5_MathTeachingResources.com

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.3 Classify objects into given categories; count the numbers in each category and sort the categories by count. *Limit category counts to less than or equal to 10.*

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Sorting objects into categories and then ordering the categories by how many are in each set is the foundation for gathering data and data analysis that will be further developed in 1st and 2nd grade. Grouping objects by common attributes is an important skill and ordering sets according to how many are in the set is a foundational building block for graphing. It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attributes being sorted.
- It is important that the students know that asking the questions, "How are these things alike? How are they different?" guides their sorts. A question should always guide your work with organizing data.
- Counting the number of objects in the categories and then organizing the categories by how many are in the set is the bridge to representing data in graphs and charts.

ESSENTIAL QUESTIONS

- How are things alike? How are things different?
- Why do we group like things together?
- Does it matter how we group objects?
- What attributes can we look at to sort items?
- Is there more than one way to sort a set of items?
- How can I record my information?

MATERIALS

- Sets of attribute blocks for each group. The real blocks are best, but you can copy attribute blocks if you must. (see attachment at the end of task)

GROUPING

Whole group and small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students together at the meeting area. Show them a set of 3-D blocks and model describing the different attributes of the set. Record the different attributes that can be seen in the blocks for the children to reference during work time. Show the students a set of attribute blocks. Ask, "What attributes could you use to describe these blocks?" Whisper your answer to your elbow partner. Then share with the class. "Are there other attributes that we can identify?" Discuss how you can create groups and sort the blocks into groups called categories according to blocks that have attributes that are alike.

Tell students they are going to explore sorting attribute blocks into categories. Give each group a pre-made bag of 10 attribute blocks.

Once they have their bag of blocks, they are to lay the blocks on the table and talk about how they are alike and how they are different. They should then decide on two categories to sort the blocks. Do not limit their thinking with the different ways that they can sort the blocks. Let the students make the decision to guide the sorts (thick and thin blocks, colors, shapes or small, medium and large shapes…just to name a few). Each student should draw a picture to show how the blocks were sorted. They should then label the groups and count how many are in each set. Encourage each student to represent their work on paper and to label the amount of objects in each set. Be ready to tell your rule for sorting the blocks or how the blocks within the set are alike and how the sets are different. Have the students order the sets according to the amount of blocks in each set. If there is time, the students should try to sort the blocks a different way.

Allow students time to share their classified groups. Discuss how many items are in each set. This gives them an opportunity to communicate their discoveries in mathematical language. Discuss with the whole group how the blocks within a set are alike and how the sets are different. The teacher should choose one set of sorted blocks to represent in a graph.

Teacher reflection questions:

- Are students able to sort objects by attributes?
- Are students able to use mathematical language to describe the sorts?
- Can students decide or offer ideas for how to organize/record information?

- Are students able to explain how to record results? Do they understand why this is important to do?
- Are students able to identify how many objects are in a set?
- Can they order the sets by the number of objects?

FORMATIVE ASSESSMENT QUESTIONS

- What attributes did you use to determine your groups?
- What are all the ways to sort the attribute blocks? How do you know you have found them all?
- Are there any more ways to compare these objects or to sort them?
- Why did you decide to classify the objects this way?
- How many objects are in each set? Can you organize the sets to represent how many are in each set?
- How can you organize your information so that someone else can see how you sorted your objects? How will you identify the attributes?

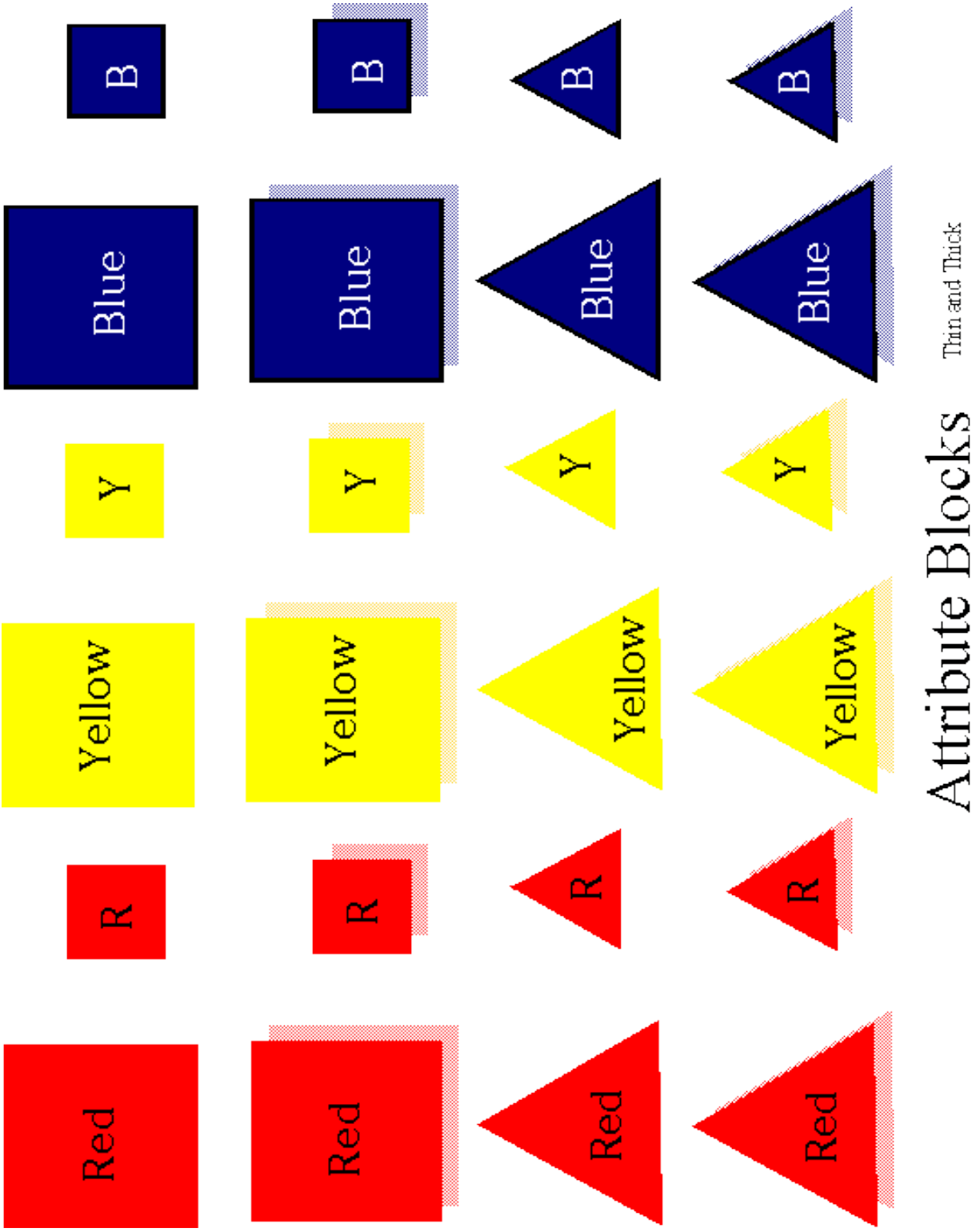
DIFFERENTIATION

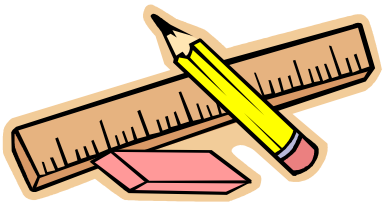
Extension

- Encourage the students to find a different way to sort the same objects and/or include pattern blocks.
- Give the student pattern blocks to repeat the activity.

Intervention

- Identify how the objects are alike and or different and label the categories for the sort for the students.





PRACTICING TASK: FUN WITH SORTING!

Approximately 2 days

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.3 Classify objects into given categories; count the numbers in each category and sort the categories by count. *Limit category counts to less than or equal to 10.*

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Students may struggle with the different attributes that are possible for sorting these objects. You may need to discuss that one child may sort the objects in one way using one set of attributes, while another child sorts it in a different way. This is a great time to discuss the importance of identifying the attribute of the sort on the paper for the viewer. It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attributes being sorted.
- It is important that the students know that asking the questions, "How are these things alike? How are they different?" guides their sorts. A question should always guide your work with organizing data.
- Counting the number of objects in the categories and then organizing the categories by how many are in the set is the bridge to representing data in graphs and charts.

ESSENTIAL QUESTIONS

- How are things alike? How are things different?
- Why do we group like things together?
- Does it matter how we group objects?
- What attributes can we look at to sort items?
- Is there more than one way to sort a set of items?
- How can I record my information?

MATERIALS

- Sets of common everyday objects for each group for example: plastic plate, Styrofoam plate, plastic cup, Styrofoam cup, plastic silverware, etc.
- Recording sheet

GROUPING

Whole group and small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students together at the meeting area. Discuss with them how we can sort common everyday items according to their attributes. Show them how the books in the classroom can be sorted by categories of books with a hard cover or books with a soft cover on them. The same books can be sorted by storybooks, informational books, teacher books, etc. (remember not to have more than 10 books in a set). We can then count the number of books in each set and organize the sets according to how many are in the set. Then we could easily tell if we had storybooks and if we needed to buy more information books. Show the students a set of common every objects such as paper plates, plastic cups, plastic silverware, Styrofoam plates, Styrofoam cups, etc. Ask, "What attributes could you use to describe these objects?" Whisper your answer to your elbow partner. Then share with the class. "Are there other attributes that we can identify?" Tell students they are going to explore sorting the objects into categories. Give each group a pre-made bag of 10 objects.
Once they have their bag of objects, they are to lay the objects on the table and talk about how they are alike and how they are different. They should then decide on categories to sort the objects into. Each student should draw a picture to show how the objects were sorted. They should then label the groups and count how many are in each set. The students should then cut the sets apart and arrange them in order according to how many are in each set. Be ready to tell your rule for sorting the objects or how the objects within the set are alike and how the sets are different. If there is time, the students should try to sort the objects a different way.
Allow students time to share their classified groups. Discuss how many items are in each set. This gives them an opportunity to communicate their discoveries in mathematical language. Discuss with the whole group how the objects within a set are alike and how the sets are different.

Teacher reflection questions:

- Are students able to sort objects by attributes?
- Are students able to use mathematical language to describe the sorts?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?
- Are students able to identify how many objects are in a set?
- Can they order the sets by the number of objects?

FORMATIVE ASSESSMENT QUESTIONS

- What attributes did you use to determine your groups?
- What are all the ways to sort the attribute blocks? How do you know you have found them all?
- Are there any more ways to compare these objects or to sort them?
- Why did you decide to classify the objects this way?
- How many objects are in each set? Can you organize the sets to represent how many are in each set?
- How can you organize your information so that someone else can see how you sorted your objects? How will you identify the attributes?

DIFFERENTIATION

Extension

- Encourage the students to find a different way to sort the same objects.

Intervention

- Identify how the objects are alike and or different and label the categories for the sort for the students.

Fun with Sorting

After drawing the objects in each group, cut the groups apart and arrange them in order by how many are in each set.

Names of Group Members:

_____

_____

Draw pictures of the objects in Group 1:

Label the Group:

_____

How many objects are in Group 1? _____

Draw pictures of the objects in Group 2:

Label the Group:

_____

How many objects are in Group 2? _____

Draw pictures of the objects in Group 3:

Label the Group:

_____

How many objects are in Group 3? _____

Draw pictures of the objects in Group 4:

Label the Group:

_____

How many objects are in Group 4? _____

PRACTICE TASK: SORTING MONEY!

Approximately 1 day

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.3 Classify objects into given categories; count the numbers in each category and sort the categories by count. *Limit category counts to less than or equal to 10.*

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Kindergarten students need much practice with sorting and labeling sorts. Once again you will want to remind them to identify how they sort the coins so that others can understand their work. You will also want to remind them that there are multiple possibilities for the sorts. It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attributes being sorted.
- It is important that the students know that asking the questions, "How are these things alike? How are they different?" guides their sorts. A question should always guide your work with organizing data.
- Counting the number of objects in the categories and then organizing the categories by how many are in the set is the bridge to representing data in graphs and charts.
- While this task introduces students to the names of various coins, the values represented by the various coins are not a critical element of the task.

ESSENTIAL QUESTIONS

- How are things alike? How are things different?
- Why do we group like things together?
- Does it matter how we group objects?
- What attributes can we look at to sort items?
- Is there more than one way to sort a set of items?
- How can I record my information?

MATERIALS

- Coins- pennies, nickels, dimes and quarters
- Recording sheet

GROUPING

Whole group and small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students together at the meeting area. Review how to identify attributes of objects, decide how objects are alike and or different, and create categories by classifying the objects according to their likenesses. Tell students they are going to practice sorting coins into categories. Give each group a pre-made bag of 15 coins.
With a partner, the students should talk about how the coins are alike and how they are different. They should then decide on categories to sort the coins into. Each student should draw a picture to show how the coins were sorted. They should then label the groups and count how many are in each set. The students should then cut the sets apart and arrange them in order according to how many are in each set. Be ready to tell your rule for sorting the coins or how the coins within the set are alike and how the sets are different. If there is time, the students should try to sort the coins in a different way.
Allow students time to share their classified groups. Discuss how many items are in each set. This gives them an opportunity to communicate their discoveries in mathematical language. Discuss with the whole group how the objects within a set are alike and how the sets are different.

Teacher reflection questions:

- Are students able to sort objects by attributes?
- Are students able to use mathematical language to describe the sorts?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?
- Are students able to identify how many objects are in a set?
- Can they order the sets by the number of objects?

FORMATIVE ASSESSMENT QUESTIONS

- What attributes did you use to determine your groups?
- Are there any more ways to compare these objects or to sort them?
- Why did you decide to classify the objects this way?
- How many objects are in each set? Can you organize the sets to represent how many are in each set?

- How can you organize your information so that someone else can see how you sorted your objects? How will you identify the attributes?

DIFFERENTIATION

Extension

- Encourage the students to find a different way to sort the same objects

Intervention

- The teacher should identify the categories for the classification

Sorting Money

After drawing the coins in each group, cut the groups apart and arrange them in order by how many are in each set.

Names of Group Members:

_____

_____

Draw pictures of the coins in Group 1:

Label the Group:

_____

How many coins are in Group 1? _____

Draw pictures of the coins in Group 2:

Label the Group:

_____

How many coins are in Group 2? _____

Draw pictures of the coins in Group 3:

Label the Group:

_____

How many coins are in Group 3? _____

Draw pictures of the coins in Group 4:

Label the Group:

_____

How many coins are in Group 4? _____

PRACTICE TASK: WHO LIVES AT YOUR HOUSE?

Approximately 2 days
This task was adapted from *Teaching Children Mathematics by NCTM.*

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.3 Classify objects into given categories; count the numbers in each category and sort the categories by count. *Limit category counts to less than or equal to 10.*

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

This performance task is designed for the teacher to collect formative information about students' mastery of classifying objects according to attributes, labeling how many in the set and organizing the categories by how many are in each set. Prior to this task, students should have multiple opportunities to practice this skill. It is important to keep several big ideas in mind when circulating throughout the room having math conversations with your students:

- It is important that the students clearly identify the attributes being sorted.
- It is important that the students know that asking the questions, "How are these things alike? How are they different?" guides their sorts. A question should always guide your work with organizing data.
- Counting the number of objects in the categories and then organizing the categories by how many are in the set is the bridge to representing data in graphs and charts.

ESSENTIAL QUESTIONS

- How are things alike? How are things different?
- Why do we group like things together?
- Does it matter how we group objects?
- What attributes can we look at to sort items?
- Is there more than one way to sort a set of items?
- How can I record my information?

MATERIALS

- Pictures representing each person that lives at the student's house. It would make a nice homework, or art class project for the student to draw, color and cut out a picture of each person that lives with them. (see attachment at the end of task)

GROUPING

Individual and small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students together at the meeting area. Review with them how we have been sorting objects by common attributes. Ask, "What are some of the categories that we have created?" Whisper your answer to your elbow partner. Then share with the class. Tell students they are going to use the pictures that they created for homework to sort them into categories. You may need to look at different ways to describe the people living in a house together. For example there are adults, children, boys, girls, brothers, sisters, grandparents, etc.

Students should use their pictures to create categories and represent the categories in an organized way so that someone else can understand. Use numbers to identify how many are in each set and then organize the sets by how many. Then get with a partner and share your work. Combine your data (pictures representing the people living in your house) and create different categories. Tell how many people are in each set and organize the sets by how many are in the sets. Challenge the students to join with a third student and repeat the process. Each time they should make sure they represent the data in an organized manner so that others can understand.

Allow students time to share their classified groups. Discuss how many items are in each set. This gives them an opportunity to communicate their discoveries in mathematical language. Discuss with the whole group how the objects within a set are alike and how the sets are different.

Teacher reflection questions:

- Are students able to sort objects by attributes?
- Are students able to use mathematical language to describe the sorts?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?
- Are students able to identify how many objects are in a set?
- Can they order the sets by the number of objects?

FORMATIVE ASSESSMENT QUESTIONS

- What attributes did you use to determine your groups?
- Are there any more ways to compare these objects or to sort them?

- Why did you decide to classify the objects this way?
- How many objects are in each set? Can you organize the sets to represent how many are in each set?
- How can you organize your information so that someone else can see how you sorted your objects? How will you identify the attributes?

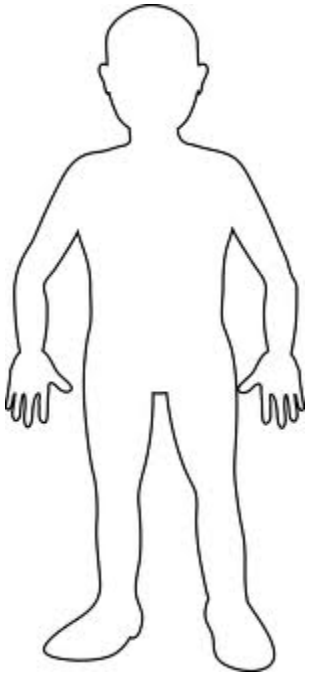
DIFFERENTIATION

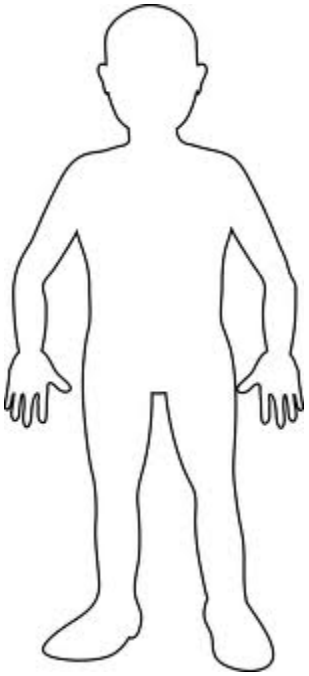
Extension

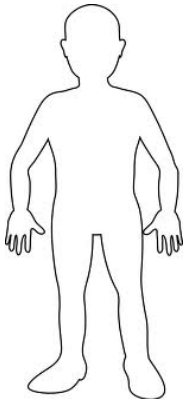
- Encourage the students to find a difference between the largest set and the smallest set.

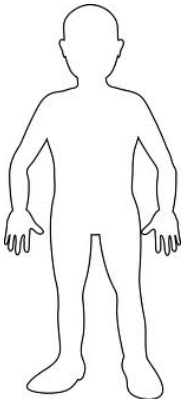
Intervention

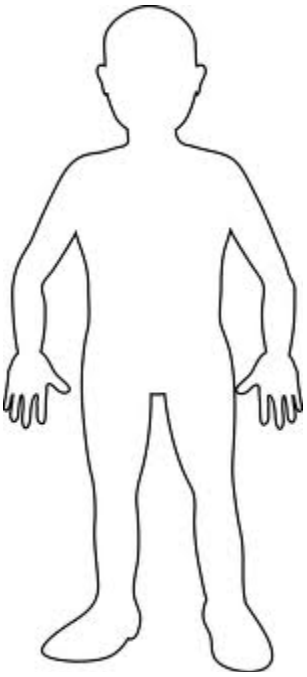
- The teacher should identify how the classify the pictures of the people.











Performance Task: Guess My Sort

Approximately 1 day

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.MD.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.

MCC.K.MD.2 Directly compare two objects with a measureable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*

MCC.K.MD.3 Classify objects into given categories; count the numbers in each category and sort the categories by count. *Limit category counts to less than or equal to 10.*

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

This task is the culmination of all that is learned in this unit. Students will identify attributes of an object, make comparisons, sort multiple objects into categories according to common attributes, count and label the number of objects in a set and order sets according to the amount identified. These concepts will lay the foundation for gathering data and data analysis that will be further developed in 1st and 2nd grade.

- Students should clearly identify the attributes being sorted or compared.
- There are specific ways to measure certain attributes, such as length (the end points must be lined up).
- Students should know that asking the questions, "How are these things alike? How are they different?" guides their sorts. A question should always guide your work with organizing data.
- Encourage the students to be creative with the different ways that the objects can be sorted.
- Counting the number of objects in the categories and then organizing the categories by how many are in the set is the bridge to representing data in graphs and charts.

ESSENTIAL QUESTIONS

- How are things alike? How are things different?
- Why do we group like things together?
- Does it matter how we group objects?
- What attributes can we look at to sort/compare items?
- Can the objects be sorted in more than one way?
- How can I record my information?

MATERIALS

- A set of random objects per pair of students (for example: coins, blocks, paper clips, erasers, bottle caps, pencils, rocks, plastic silverware, plastic cups, etc.)

GROUPING

Partners

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students together at the meeting area. Show them an assortment of random items and model how to compare different objects by their attributes and choose different items from the pile to create sorts (no more than 3 categories). The partner should try to guess the rule for how the categories are alike. When the partner guesses the rule for the sort, he/she should count the number of objects in each category and order each set according to the amount. Demonstrate how to take turns playing the game and how to communicate with the partner about how the items are alike. Encourage the students to be creative with the sorts, always identifying the attribute that the set has in common. Discuss different ways you can create groups and sort the objects into groups called categories according to the attributes that are alike.

Tell students they are going to play the game with a partner. Taking turns each student chooses objects from the pile to compare and create categories. The other student tries to guess the rule for the sort (how the objects in each category are alike). When that partner gets the rule correct, he/she counts the number of objects in each set and orders the set according to the amount. The partner to guess the rule should describe the categories to the teacher and tell how many objects are in each set. Then the students change roles and play the game again.

Allow students time to share their classified groups with other students and discuss how many items are in each set. This gives them an opportunity to communicate their discoveries in mathematical language. Choose at least one set of data to discuss with the whole group and show the information represented in a graph.

Teacher reflection questions:

- Are students able to sort objects by attributes?

- Are students able to use mathematical language to describe the sorts?
- Can students decide or offer ideas for how to organize/record information?
- Are students able to explain how to record results? Do they understand why this is important to do?
- Are students able to identify how many objects are in a set?
- Can they order the sets by the number of objects?

FORMATIVE ASSESSMENT QUESTIONS

- What attributes did you use to determine your groups?
- What are all the ways to sort the attribute blocks? How do you know you have found them all?
- Are there any more ways to compare these objects or to sort them?
- Why did you decide to classify the objects this way?
- How many objects are in each set? Can you organize the sets to represent how many are in each set?
- How can you organize your information so that someone else can see how you sorted your objects? How will you identify the attributes?

DIFFERENTIATION

Extension

- Encourage the students to find a different way to sort the same objects and/or use other objects from the pile to create different sorts.

Intervention

- Limit the number of objects in the pile for the student to choose from for the sort.
- Identify how the objects are alike and or different and label the categories for the sort for the students.