NVACS: Measurement and Data

In Kindergarten, students must:

Describe and compare measurable attributes.

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

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

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

K.MD.3 -   Classify objects and count the number of objects in each category. Sort the categories by count (less than or equal to 10).

Mathematically proficient kindergartners communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language when describing objects. Student will describe objects with measurable, including length, width, height, and weight, and non-measurable attributes, such as, color, texture, etc. Terms students should learn to use with increasing precision with this cluster are measurable attributes: **length, weight, heavy, heavier, long, longer, tall, taller, short, shorter, more of, less of.**

At first, students in kindergarten will describe objects as bigger or smaller. As they are provided with many opportunities to explore objects and engage in classroom discussions, they will develop more precise language to describe specific objects. For example, at first a student might say "My desk is bigger than Tony's." Later, the student will say, "My desk is taller than Tony's," Students will also be able to use more than one attribute to describe an object. "My desk is taller and heavier than Tony's."

Kindergartners will work on measuring objects through direct comparison. They should have many experiences lining two objects together and describing what they see using precise vocabulary. "The blue book is longer than the green book."

Conservation of length is important for kindergartners to develop. It is important for the students to understand that the length does not change no matter how I put the object down. The idea that "Sometimes the blue book is longer than the green book," depending on how they are laid down will turn into, "This blue book is always longer than the green book." With multiple and varied experiences, students will understand the importance of lining up the ends of objects in order to measure accurately. In order to develop this understanding, students need to work with objects that can be moved and lined up. Asking students to compare objects that cannot be lined up before working with objects that cannot, may result in misconceptions.

Students identify similarities and differences between objects, such as, size, color, and shape. They then use the identified attributes to **sort** a collection of objects. Once the objects are sorted, the student counts the amount in each set. Once each set is counted, then the student is asked to sort (or group) each of the sets by the amount in each set.

For example, when given a collection of buttons, the student sort the buttons into different piles based on color putting all the blue buttons in one group, etc. Then the student counts to find out the number of buttons in each pile.

blue	6
green	3
red	5
purple	3
brown	6

When they have finished sorting and counting, the student organizes the sets.
> green 3 and purple 3
> red 5
> blue 6 and brown 6

When sorting, counting and organizing sets of objects, it is important for students to:
- explain how they sorted the objects
- label each set with a category
- answer a variety of counting questions that ask, "How many …"
- compare sorted groups using words such as, "most", "least", "alike" and "different"

This helps to build a foundation for data collection in future grades where students will transfer these skills to creating and analyzing various graphical representations.

Developing Precise Language, Whole Group:

Students will develop precise language by having conversations with their teacher and classmates using attributes to describe objects. The teacher is available to attach precise language to the students' less sophisticated language.

For example: Students come to the front of the room and can be described using multiple attributes.

Sydney:	Kody is bigger.
Teacher:	What do you mean? Is he taller? Are his arms longer?
Sydney:	Yes. I mean Kody is taller than Sam.
Teacher:	How do we know?
Jorge:	Have them stand next to each other.
Lily:	With their backs to each other.
Jorge:	Kody's arms are longer.
Lily:	Sam's legs are shorter.

Developing Precise Language, Independent Work:

When students have had many opportunities to use precise language with the guidance of the teacher, they can do many of the same activities as stations.

For example: Students can compare themselves to a partner and record.

Name_____
Who did you work with? _Maddy_

Who was shorter? _____
Who was taller? _____
Who had longer hair?_____

Direct Comparisons:

Students should be given many experiences to focus on attributes by making direct comparisons.

For example: When finding out which piece of string is longer, ask students to discuss and justify their answers to these questions:
- Which string will be longer?
- Why do you think so?
- How could you find out?

This activity can become a station. Different lengths of string tagged with letters of the alphabet are put in a bag. The student draws out 2 pieces, lines cubes or beans, or other counters, up along the string to find out how many cubes long, compares the lengths and records.

Name_____
Measuring String

String _A_ was ___9___ long.

String _T_ was ___6___ long.

String _A_ was longer.

Sorting objects:

Students should have a variety of opportunities to sort objects into given categories (up to 10 in each category). At first, the categories will be "are" and "are not."

For example: Students who are sorting shapes can sort them into two groups – Squares and Not Squares. Then the students count how many objects are in each group and organize them from least to greatest.

4 squares

5 not squares
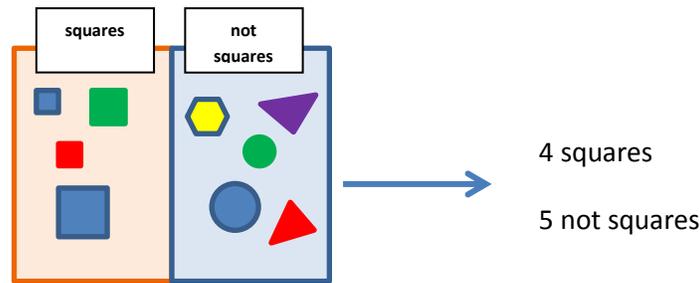
Guess My Rule:

It is beneficial for students to analyze a sort and figure out what the rule was.

For example: Ask the students how they think the buttons were sorted.
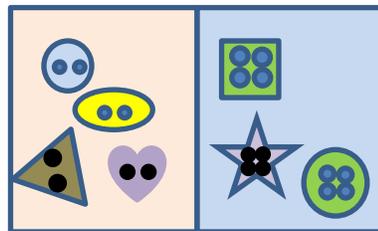
Alexis:	I think one side is green one side is not green.
Teacher:	All they all green on this side?
Alexis:	Almost.
Taylor:	If it's the rule, they all have to be green.
Carlos:	The buttons on one side have two holes and the other side has four holes.
Taylor:	Yep. They all fit the rule.