Next Steps and Instructional Moves

The intended purpose of this document is to provide teachers with a tool to determine student understanding and suggest instructional moves that may help guide a student forward in their learning of a particular concept or standard. This guide is not an exhaustive list of strategies.

Fifth Grade: Cluster 1
Measurement and Data
Creating Classroom Community through Data and Graphing

NC.5.MD.2 Represent and interpret data.

- Collect data by asking a question that yields data that changes over time.
- Make and interpret a representation of data using a line graph.
- Determine whether a survey question will yield categorical or numerical data, or data that changes over time.

NC.5.G.1 Graph points in the first quadrant of a coordinate plane, and identify and interpret the x and y coordinates to solve problems.

NC.5.OA.3 Generate two numerical patterns using two given rules.

- Identify apparent relationships between corresponding terms.
- Form ordered pairs consisting of corresponding terms from the two patterns.
- Graph the ordered pairs on a coordinate plane.

Not Yet

Students that are consistently scoring "Not Yet" on measurement and data could have a variety of errors. These errors may include confusion about creating survey questions that yield categorical data, numerical data, or data that changes over time. Students may also find difficulty making and interpreting data using a line graph. Students may also struggle with graphing points in the first quadrant.

Next Steps:

For students struggling to develop survey questions that yield categorical data, numerical data, or data that changes over time (NC.5.MD.2):

- Pose tasks that require students to develop a question, predict responses, and then collect data from their classmates. Example: Develop a "what is your favorite __?" question and give 4 choices to select from (categorical data). Develop a "how many ____ ?" question such as "how many hours of sleep did you get last night? (numerical data). Develop an experiment in which you would record numerical data that changes over time such as temperature outside during the day, heart rate before, during, and after exercise, or amount of water consumed in a container during the day.
- Create a variety of survey questions that will yield categorical, numerical, or data that changes over time. Encourage students to use a table to sort the questions into the categories. Be sure students justify their reasoning as they sort.

Categorical Data	Numerical Data	Data That Changes Over Time

Next Steps and Instructional Moves

	For students struggling with graphing on a coordinate plane in the first quadrant (5.NC.G.1) or making a line graph (5.NC.MD.2): ● Begin by plotting points with x and y coordinates that are 5 or less only. Provide students with tasks in which they are given a point and have to name the coordinates as well as tasks in which students are given the coordinates and have to create the point. ● Use a geoboard with labeled axes and cheerios to locate ordered pair. This kinesthetic activity will encourage the students to physically locate the x and y coordinates. ● Create tasks where students can walk the first quadrant of the coordinate plane. Involve students by allowing them to use painters tape to create a 10 x 10 coordinate plane on the floor of your classroom. Students should label the axes at the intersection points. Starting at the origin, encourage student to walk the number line using ordered pairs created on index cards. ● Read aloud, A Fly on the Ceiling by Julie Glass and follow-up with an activity in which students must plot points on the coordinate grid. ● Once data that changes over time has been collected, have students discuss appropriate numbers for the axis as well as a scale if needed. Students should plot points and use a ruler or straight edge to connect points. Discuss with students the importance of being careful and making sure points line up to the correct values on the x and y axes. ● The Where Do the Points Go? task provides an opportunity to work on plotting points. **For students demonstrating difficulty exploring patterns with two rules (NC.5.OA.3):** ● Begin by having students generate a pattern with only one rule, such as in Grade 4. This work in Grade 4 started by having students generate additive patterns, such as starting at 0 and add 4 each time: 0, 4, 8, 12. In Grade 5, students explore and compare two different rules: add 4 each time and add 8 each time, where one sequence would be 0, 4, 8, 12, and the other would be 0, 8, 16, 24.

Progressing	**Students that are consistently scoring "Progressing" may still have confusion interpreting the difference in numerical data, categorical data, and data that changes over time. They may reverse the x and y axis on the coordinate plane. They may have trouble analyzing two numerical patterns made with two different rules.**
	Next Steps: **For students struggling to develop survey questions that yield categorical data, numerical data, or data that changes over time (NC.5.MD.2):** ● Pose tasks that require students to develop a question, predict responses, and then collect data from their classmates. Example: Develop a "what is your favorite __?" question and give 4 choices to select from (categorical data). Develop a "how many ____ ?" question such as "how many hours of sleep did you get last night? (numerical data). Develop an experiment in which you would record numerical data that changes over time such as temperature outside during the day, heart rate before, during, and after exercise, or amount of water consumed in a container during the day.

Next Steps and Instructional Moves

- When students are progressing with this standard, ask them to create a variety of survey questions that will yield categorical, numerical, or data that changes over time. Encourage students to use a table to sort the questions into the categories and justify their reasoning.

Categorical Data	Numerical Data	Data That Changes Over Time

For students struggling with graphing on a coordinate plane in the first quadrant (5.NC.G.1) or making a line graph (5.NC.MD.2):

- Once data that changes over time has been collected, have students discuss appropriate numbers for the axis as well as a scale if needed. Students should plot points and use a ruler or straight edge to connect points. Discuss with students the importance of being careful and making sure points line up to the correct values on the x and y axes.
- Provide students with points already plotted on the coordinate plane and have them determine the coordinates of each point.
- The Room Temperature task provides opportunities for students to plot data that changes over time and make a line graph.

For students demonstrating difficulty exploring patterns with two rules (NC.5.OA.3):

- Provide two patterns with two different additive rules that have related multiples, such as add 4 and add 8. where one sequence would be 0, 4, 8, 12, and the other would be 0, 8, 16, 24. When looking at the sequences written out or on a graph, students may see a relationship between the terms.

Pattern 1	0	4	8	12
Pattern 2	0	8	16	24

- Create one pattern using a real world connection. Have students record the pattern using a table. Encourage students to create a second rule of their own. Record pattern in the table. Have students identify the apparent relationship between patterns and justify their reasoning.

Money Saved		
Day	Kelly $2.00 per day	Logan
1		
2		
3		
4		
5		

Next Steps and Instructional Moves

Meets Expectation	**Students that are consistently scoring "Meets Expectation" in this cluster are able to identify the different types of data, represent the various types of data correctly, and interpret the data correctly. Further, students are able to generate, plot points for, and analyze two different numerical patterns made with two different rules.**
	<u>Next Steps:</u> **For students who have demonstrated proficiency related to posing questions for different types of data, representing and interpreting data (NC.5.MD.2):** ● Provide opportunities for students to collect more data sets, examine representations, and interpret the data by answering questions. Students could also create data sets and questions based on the data sets to have other classmates answer. ● Link posing questions to the 5^{th} grade science standards such as forces and motion. Ask "what if…" questions such as "Will the height of the ramp affect the distance a toy car will travel?" Conduct a science lab to explore the question. Collect data using a table. Graph data. Write two or three analytical statements about the apparent relationship between the two sets of data from the science lab investigation. **For students who have demonstrated proficiency related to examining patterns with two rules (NC.5.OA.3):** ● We recommend spending time on other Standards once students have demonstrated proficiency with this Standard.