PERFORMANCE TASK: IT'S A DATA PARTY!

STANDARDS FOR MATHEMATICAL CONTENT:

MCC.3.MD.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

MCC.3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units – whole numbers, halves, or quarters.

MCC.3.NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

MCC.3.NBT.3 Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80, 5×60) using strategies based on place value and properties of operations.

MCC.3.NBT.1 Use place value understanding to round whole numbers to the nearest 10 or 100.

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

Examples of the survey data are shown below.

Drink	Number
Sprite	6
Coke	3
Fruit Punch	8
Orange Drink	4
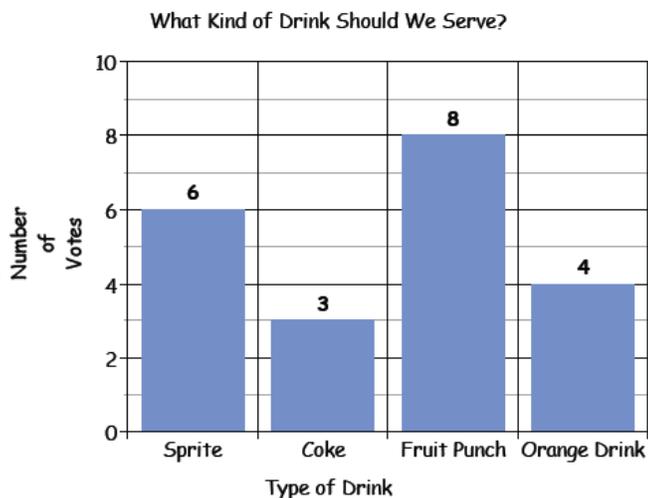
What Kind of Drink Should We Serve?

(Bar graph — Number of Votes vs. Type of Drink: Sprite 6, Coke 3, Fruit Punch 8, Orange Drink 4)

Dessert	Number
Brownies	5
Cupcakes	2
Strawberries & Grapes	7
Chocolate Chip Cookies	7

What Kiind of Dessert Should We Serve?

Description	1	2	3	4	5	6	7	8	9	10
Brownies	★	★	★	★	★					
Cupcakes	★	★								
Fruit	★	★	★	★	★	★	★			
Cookies	★	★	★	★	★	★	★			

Each ★ indicates one vote

Snack	Number
Chips	10
Nuts	1
Popcorn	7
Pretzels	3

What Kind of Snack Should We Serve?
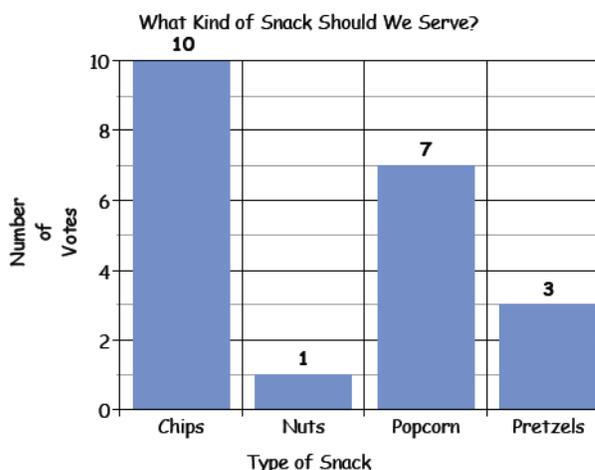
*Note: Line plot graphs would not be appropriate for this type of data, because it is categorical.

ESSENTIAL QUESTIONS

- How can data be used to make decisions?
- How can data displays be used to describe events?
- How can I analyze data and use what I've learned to answer mathematical questions about it?

MATERIALS

- "It's a Data Party!" student recording sheet
- Paper, markers, crayons, rulers, and other supplies needed to create graphs
- Yellow hexagon pattern block, about 3
- Straw, one for each student
- Stopwatch (2-4) or classroom clock with a second hand
- Chart paper on which to record student data, one for each party challenge (at least 3)

GROUPING

Individual/Small Group Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Students survey the class to determine what could be served during a class party. They then create data displays and write a letter to the teacher describing what should be served at the party and how the data supports the menu items.

It's up to the students in your class to figure out what the menu will be. You will need to survey the class to find out what kind of refreshments to serve. Don't forget to find out about drinks, snacks, and dessert.
You'll also need to write a letter to the teacher with the menu and how you decided what to serve. Be sure to use tables and graphs to support your decisions.

Complete the following steps to determine what should be served at the party.
Survey the class to find out what should be served.
Organize your data in tables and create graphs. Use at least one bar graph and one pictograph to display your data.
Write a letter to your teacher, including the tables and graphs to support the recommendations you make.

Create a line plot, bar graph, and pictograph to display the data collected for each challenge.
Create a bar graph for the Challenge #1: "Name Mixer": Students will record the number of letters in classmates' names and create a graph from their data.
Create a line plot graph for Challenge #2: How far can you blow a Pattern Block?
Create a pictograph for Challenge #3: "School Supply Scavenger Hunt": Students will record and graph the number of scissors, pencils, pens, markers, and bottles of glue they can find in the classroom. The graph should have a scale of 2 or 5.

Choose one to summarize in a paragraph. Describe what the data tells you about the challenge. Be sure to include how you know.

Analyze and ask questions about your data
  Use your data and graphs to create questions that can be asked about your findings. At least one of the questions should be multistep. Then, exchange your questions with another group member and answer them. Ask at least one question about each of the following:
  ☐Joining and Combining (Addition)
  ☐Separating and Comparing (Subtraction)
  ☐Multiplying by Ten
  ☐Rounding to the Nearest Ten and Hundred

While students will need to work in small groups of 3-4 students, each student is expected to create the required graphs and write a letter to the teacher.

Part I – Collect and display survey data
Begin this task by engaging the students in a brainstorming session of ideas for what to serve at the data party. Develop choices for three categories, drinks, snacks, and desserts. Narrow the lists down to 4 choices for each category. Students can then create a survey table on which to record the data collected regarding what to serve.

If there is a tie (with what to serve at the party) ask students to survey the class regarding what they "like" instead of choosing a "favorite." Record the data collected in a Venn diagram to choose the item more students like. (See the example in the "Background Knowledge" section.)

Part II – Collect and display "challenges" data
Students will collect, record, and display data during the party (but maybe before the food is served) by participating in several "challenges."

> Challenge #1: "Name Mixer": Students will record the number of letters in classmates' names and create a graph from their data.
> Challenge #2: How far can you blow a Pattern Block using a straw?
> Challenge #3: "School Supply Scavenger Hunt": Students will record and graph the number of scissors, pencils, pens, markers, and bottles of glue they can find in the classroom. The graph should have a scale of 2 or 5.

For challenge #1, students should work individually, or with a partner. Students will begin by going around and surveying their classmates. They will use their data to create a bar graph.

For challenge #2, secure a tape measure to a long table with the zero end of the tape measure at the edge of the table. Have students place the pattern block at the edge of the table and blow the pattern block, using a straw. As a class, students can choose how many practice tries they can have or if they would like to use the longest distance out of three tries.

Class lists or data tables can be created and posted next to the stations for each challenge on which students can record their challenge data. There can be two or three stations for the same challenge, allowing all students to be participating at the same time. Once all students have completed all three challenges, the data can be summarized on one class list or data table that is large enough for all students to see. Students can use this class data to create three different types of graphs, one graph for each challenge. Students should write a summary of the data for one of the line plot graphs, telling classmates what the data tells them about the challenges and justifying their conclusions.

*Note: "How far can you blow a pattern block?" was adapted from the Investigations in Number, Data, and Space third grade curriculum unit, ***From Paces to Feet: Measuring and Data***, by Karen Economopoulos, Jan Mokros, and Susan Jo Russell, 2004, Glenview, IL: Pearson Education, Inc.

Part III – Analyze and ask questions about your data
Students will use their data and graphs to create questions that can be asked about their findings. At least one of the questions should be multistep. They will then exchange their questions with another group member and answer them. Questions should cover the following concepts:
- Joining and Combining (Addition)
- Separating and Comparing (Subtraction)
- Multiplying by Ten
- Rounding to the Nearest Ten and Hundred

QUESTIONS FOR FORMATIVE ASSESSMENT

- What are the ways you can appropriately display categorical data? (i.e. data in categories such as the choices for foods and drink to serve at the party)
- What is an appropriate way to display numerical data?
- Did you include all necessary information in your graph? (i.e. title, labels, scale increments)
- What does the data tell you about your classmates' favorites? Your classmates' ability to jump or blow a pattern block? How do you know?
- According to the data, what should be served at the data party? How do you know?
- What comparisons can you make using your data using numbers?
- What is the difference between the actual choices for the party and the estimates?
- On your shopping trip to get the party supplies, would you think that is best to get the actual amounts or the estimates? Why?

DIFFERENTIATION

Extension
- Instead of creating a line plot graph for the challenges, ask students to create two line plot graphs for each challenge, one for the boys' data, and one for the girls' data. Then ask students to summarize and compare the boys' and girls' data for one of the challenges.
- http://illuminations.nctm.org/LessonDetail.aspx?ID=L243 Replace one of the challenges with this task.

Intervention
- Some students may require scaffolding for creating graphs. See the links below for some possible ways to scaffold the creation of graphs.
-

TECHNOLOGY CONNECTION

- Graphs can be created using templates such as the pictograph template below:
  http://www.beaconlearningcenter.com/documents/2351_5255.pdf
- Pictographs can be created using excel following the directions below:
  http://faculty.kutztown.edu/schaeffe/Excel/Vallone/Vallone_Excel.pdf

- Pictographs can be created using a website such as:
  http://gwydir.demon.co.uk/jo/numbers/pictogram/pictogram.htm
- Bar graphs can be created using a website such as:
  - http://nces.ed.gov/nceskids/createagraph/ or
  - http://illuminations.nctm.org/ActivityDetail.aspx?ID=63