**Lesson Plan: Data Helps Us Answer Everyday Questions** (This lesson should be adapted, including instructional time, to meet the needs of your students.)

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| **Background Information** | |
| **Content/Grade Level** | Grade 1 Measurement and Data |
| **Unit/Cluster:** | 1.MD.C.4 Represent and interpret data |
| **Essential Questions/Enduring Understandings Addressed in the Lesson** | * Why is data collected and analyzed? * How can information be gathered, recorded, and organized? * How can predictions be made based on data? * How does the type of data influence the choice of display? * How does the way we display data influence our interpretation of it? * How does collecting data help us solve problems or make decisions in our world? * Can data be sorted or organized in different ways? Is one way better than another? * Data can be sorted and organized in order to answer questions and solve problems. * The quality of the question used impacts the data collected and the validity of the results. * The way data is displayed or organized influences interpretation. |
| **Standards Addressed in This Lesson** | * 4.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.   It is critical that the Standards for Mathematical Practice are incorporated in ALL lesson activities throughout the unit as appropriate. It is not the expectation that all eight Mathematical Practices will be evident in every lesson. The Standards for Mathematical Practice make an excellent framework on which to plan your instruction. Look for the infusion of the Mathematical Practices throughout this unit. |
| **Lesson Topic** | Data helps us answer everyday questions like how much pizza or chocolate milks the cafeteria needs to order. |
| **Relevance/Connections** | This activity can be adapted to fit your school’s routine for ordering lunches, making the activity relevant to children’s lives. Students will explore methods for collecting information needed by school staff. |
| **Student Outcomes** | * Students will sort data into three categories. * Students will record information using a symbol to represent each student choice. * Students will represent data in an appropriate graph such as a picture graph. * Students will answer questions about the data such as, “Which category has more?” “Which category has less?” “How do cafeteria workers use the data we collect?” * Students will solve simple put-together, take-apart, and compare problems using the information represented in the sorted sets. |
| **Prior Knowledge Needed to Support This Learning** | Students need to sort objects into categories, count objects, and justify why their interpretation of the data is correct. |
| **Method for determining student readiness for the lesson** | Teacher observes students during sorting and counting activities to determine readiness for displaying data. |

| **Learning Experience** | | |
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| ***Component*** | ***Details*** | ***Which Standards for Mathematical Practice(s) does this address? How is the Practice used to help students develop proficiency?*** |
| ***Warm Up*** | * Ask students what they had to drink with their breakfast. * Record data. * Discuss how parents and schools use this data to order/buy enough of the right kind of drink for your breakfast. | SMP 1: Make sense of problems and persevere in solving them – Students discuss how parents and schools figure out what to order for students.  SMP 6: Attend to precision – Student use appropriate mathematical terms as they discuss this problem. |
| ***Motivation*** | Option 1   * Invite a cafeteria worker to speak to your class about how classroom lunch orders are used each day to order and prepare food.   Option 2   * Read a children’s book about the lunchroom such as*, Bread and Jam for Frances* by Russell Hoban or *The Cafeteria Lady from the Black Lagoon* by Mike Thaler. |  |
| ***Activity 1***  UDL Components   * Multiple Means of Representation * Multiple Means for Action and Expression * Multiple Means for Engagement   Key Questions  Formative Assessment  Summary | **UDL Components** are embedded in activities 1, 2, and 3: **Multiple Means of Representation** is present when the teacher provides background knowledge, highlights the big ideas and relationships in graphing, and assists students in transferring and generalizing graphing to other problems.  **Multiple Means for Action and Expression** are present when the teacher guides the students as they develop their own data representations.  **Multiple Means for Engagement** is present when the teacher optimizes individual choice in creating data representations and in optimizing the relevance and authenticity of the task by evaluating a daily routine of collecting the lunch count.  Materials Needed:   * Class List (one copy per student) * Copy of Cafeteria Order Form (to be projected for students to view)   Directions:   1. Discuss that the cafeteria wants us to tell them each day how many students are buying lunch and how many students are packing lunch. Why would they want to know this information? How would they use the information? 2. Teacher should take the daily count for the cafeteria. For example, students could select lunch choice #1, lunch choice #2, or pack their own lunch. 3. Distribute a class list to each student. Ask each student what he/she ordered. Students record each student’s choice for lunch. For example, students could record “1” for choice #1 or “2” for choice #2 or ‘P” for packing their own lunch. 4. What did we order most of? How can we tell? How can we display this data so that the cafeteria can use it? Share the form the cafeteria requires each day. Discuss other ways the data could be displayed. How can we show how many students want choice #1? | SMP 4: Model with mathematics – Students record lunch data  SMP 6: Attend to precision – Students use appropriate mathematics vocabulary when discussing the data needed by the cafeteria. |
| ***Activity 2***  UDL Components   * Multiple Means of Representation * Multiple Means for Action and Expression * Multiple Means for Engagement   Key Questions  Formative Assessment  Summary | Materials Needed:   * Blank piece of paper (one per student)  1. Distribute a blank sheet of paper to each student to display the data. Their display should clearly show how many students are making each choice. 2. Teacher should circulate around the room and assist students as needed. Ask clarifying questions to guide student thinking: “How can you show me the number of students who want lunch choice #1?” “How could you represent each student who chose lunch choice #1 in your display?” 3. Allow students to share their representations. Discuss which representations appear to be clear and easily understood. How will this representation help the cafeteria know how much food to order and cook?   Formative assessment: Use student produced data representations to group students for instruction. Students displaying misconceptions could work with the teacher in a small group. | SMP 3: Construct viable arguments and critique the reasoning of others – students respond to the representations made by others and ask questions about them.  SMP 4: Model with mathematics – Student record the data in an appropriate display.  SMP 5: Use appropriate tools strategically – Students use charts or graphs appropriately in displaying the data.  SMP 6: Attend to precision – Students use appropriate displays and language in presenting and discussing their displays. |
| ***Activity 3***  UDL Components   * Multiple Means of Representation * Multiple Means for Action and Expression * Multiple Means for Engagement   Key Questions  Formative Assessment  Summary | Teacher will lead students in analyzing and interpreting the data. Ask:   * Which choice did our class order most? How can we tell? How many more students ordered choice #1 than packed? How many students are buying lunch today? (Add choice #1 and #2) How can we make sure everyone’s choice is included? * What kind of equation could represent our data? * Which methods are best for collecting this data? Why are these methods best? (*Teacher note: Once your class has determined the representations that are clear and precise, you may want to display them for future reference.*) * How can our representation help us complete the form for the cafeteria? Why is it important to be precise when we send this information to the cafeteria? * If choice #2 had been different (for example, pizza instead of grilled cheese sandwiches) would the results have been the same? How might we figure this out for sure?   Summary: Discuss how graphs can help us display data and answer everyday questions. (Teacher note: Students should continue to have experiences collecting and representing data displays. Other questions could be favorite ice cream flavors, favorite snacks, or type of shoes worn to school.) | SMP 2: Reason abstractly and quantitatively – Student decide on the best representation of the data and share the results.  SMP 7: Look for and make use of structure – Students used the structure of the charts and graphs to correctly display the data.  8 Look for and express regularity in reasoning – Students shared patterns they see in the data to make sense of the results. |
| ***Closure*** | Topics for Class Discussions:  How can representing data be used in other ways? For example, how many students are attending school today? Who would want this information? What games do students like to play at recess? Who could use this information and how would they use it? | SMP 2: Reason abstractly and quantitatively – Students apply their understanding of data collection to dealing with real life activities at school.  SMP 8: Look for and express regularity in reasoning – Students use the patterns they see in the data to make sense of it. |

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| **Supporting Information** | |
| **Interventions/Enrichments**   * Special Education/Struggling Learners * ELL * Gifted and Talented | Special Education/Struggling Learners:   * Work with students in a small group to display data. * Provide a frame or reference to assist them in developing a recording system. * Limit the data to two choices, buying or packing.   ELL:   * Use pictures of students and/or food items. * Provide models as appropriate to guide students in this activity. For example, use cubes to represent student choices and compare the cubes to understand more/less. * Scaffold questions according to students’ needs.   Gifted and Talented:   * Encourage students to investigate a related question such as “How does our data compare to another first grade class?” or “What is the most popular choice for the whole school?” “How can we collect this data?” |
| **Materials** | * *Bread and Jam for Frances* by Russell Hoban or *The Cafeteria Lady from the Black Lagoon* by Mike Thaler * Chart paper and markers * Your school’s lunch form * Drawing paper for individual data representations * Cubes * Class list for each student |
| **Technology** | * <http://nces.ed.gov/nceskids/createagraph/default.aspx> (allow students to create data representations using their own data) * Teachers can use interactive whiteboards to record data representations |
| **Resources**  (must be available to all stakeholders) | *See the Unit Resource Links to access various resources.* |