**Leaping Line Plots**

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| In this lesson, students will participate in the long jump to create a class set of data. Students will create a line plot and make discoveries about the data they record. |

**NC Mathematics Standards:**

**Measurement and Data**

**NC.4.MD.4** Represent and interpret data using whole numbers.

* Collect data by asking a question that yields numerical data.
* Make a representation of data and interpret data in a frequency table, scaled bar graph, and/or line plot.
* Determine whether a survey question will yield categorical or numerical data.

**Supporting Standards:**

**NC.4.MD.1** Know relative sizes of measurement units. Solve problems involving metric measurement.

* Measure to solve problems involving metric units: centimeter, meter, gram, kilogram, Liter, milliliter.
* Add, subtract, multiply, and divide to solve one-step word problems involving whole-number measurements of length, mass, and capacity that are given in metric units.

**Standards for Mathematical Practice:**

1. Make sense of problems and persevere in solving them.

4. Model with mathematics.

5. Use appropriate tools strategically.

6. Attend to precision.

**Student Outcomes:**

* I can create and record data on a line plot.
* I can make discoveries about the data recorded on a line plot.

**Math Language:**

* centimeters
* meters
* measure
* convert
* line plot
* graph

**Materials:**

* meter sticks, measuring tapes, or measurement floor mat
* student graphic organizer
* construction paper or poster paper to display data
* markers

**Advance Preparation**:

* Use tape to mark off a start line for students to jump from. (If you are using a measurement mat this will be done for you.) You can create multiple start lines for small groups to use.
* Type student names in graphic organizer (attached)

**Launch:**

1. Introduction of Task (15 – 20 minutes)

Begin this lesson by showing the video clip found at this website (<https://www.youtube.com/watch?v=pbnRw8TAoU4>). This is a video clip of a nine year old completing the long jump. Ask students if they have ever completed a long jump. If they have completed the long jump, have them describe the experience to the class. Explain that some students may compete in long jump contests during field day, PE, or even at recess.

Students will then complete the long jump. This may be done in the classroom, hallway, gym, outside, or another location that provides more space. Students will take turns jumping and then measuring the distance jumped from the start line to where the back of the heel lands. Have students come to the board and record their name and the distance they jumped in centimeters.

Once all students have recorded their distance on the board, have a class discussion about what observations can quickly be made by looking at the data. Explain to students that they will work together (or independently) to create a line plot displaying the data on poster paper.

**Explore:**

1. Creating a Line Plot (15 – 20 minutes)

Allow time for students to create a line plot displaying the data. Observe students as they create the line plots. Carefully select aspects of the graphs that you would like to highlight during the discussion (labels, number line, organization, size or organization of Xs).

Observe:

* How are students organizing and representing their thinking?
* How do students organize their number line and decide which numbers to begin and end the line plot with?
* What challenges do students have as they create the line plot?
* Are student discoveries appropriate and relevant to the data?
* What vocabulary are students using as they solve the task?

Once the line plots are completed, instruct students to record four discoveries they can make by analyzing the data. Student discoveries should use academic vocabulary such as (sum, difference, total, greatest, least, combined, etc.). Discoveries can be written on the poster paper with the line plot, sticky notes, or on a clean sheet of paper.

**Discuss:**

1. Discussion of Solutions (15 – 20 minutes)

Once all students have had the opportunity to create their line plot and find discoveries about the data, come back together as a whole group to share discoveries. Be purposeful in choosing which discoveries to share first. Some examples may include:

* How many students participated in this activity?
* How many students jumped \_\_\_ centimeters or more?”
* What is the total distance jumped by students who jumped farther than \_\_\_\_ centimeters?

Highlight aspects of the line plots (labels, number line, organization, size or organization of Xs) that need to be addressed. Discuss any challenges students had as they were creating the graphs. Conclude the lesson by having students identify one thing they learned about creating and interpreting a line plot.

**Evaluation of Student Understanding:**

**Informal Evaluation:**

* Observe and monitor students as they solve the problem. How are they making sense of the problem? Are they using mathematical vocabulary as they solve and discuss the problem?

**Formal Evaluation/Exit Ticket:**

* Ensure that line plot display and discoveries are accurate. Post one question about the data that no student used in their discovery such as “If we combined the distance of all students who jumped \_\_\_ centimeters, what would the combined distance be?”

**Meeting the Needs of the Range of Learners:**

**Intervention:**

* Provide students who are unable to sequence the numbers on the line plot with a number line/line plot that has already been labeled.Suggest for students to start with the smallest distance and place those on the line plot first. Suggest marking off each piece of data after it is added to the line plot to help students organize the information.

**Extension:**

* Challenge students to use the same data and create a different representation such as a frequency table or scaled bar graph. Challenge students who complete this task quickly to convert all of the distances jumped from centimeters to millimeters. (This is not a fourth grade standard. Fourth graders are only required to convert from large units to smaller units within meters and centimeters.)

**Possible Misconceptions/Suggestions:**

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| **Possible Misconceptions** | **Suggestions** |
| * Students do not understand what each X represents on the line plot.
* Students are confused between the most common distance and the farthest/largest distance.
 | * Have students count to make sure they have included all data on the line plot before beginning their discoveries. One missing piece of data will cause the discovery answers to be incorrect when comparing with peers.
* Make a “human line plot” using butcher paper. After all data has been collected, have students stand on their distance so students can clearly see the most common distance jumped (where most kids are standing) compared to the farthest distance jumped.
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**Leaping Line Plots**

Directions: Record the distance jumped by each of your classmates below.

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| **Student Name:** | **Distance Jumped** *(cm):* |
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