**CONSTRUCTING TASK: Leap Frog**
**(adapted from Baltimore County Public Schools)**

## STANDARDS FOR MATHEMATICAL CONTENT

**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.

## STANDARDS OF 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

"The need to gather data will come from the class naturally in the course of discussion or from questions arising in other content areas. Science, of course, is full of measurements and thus abounds in data requiring analysis. Line plots are useful counts of things along a numeric scale. One advantage of a line plot graph is that every piece of data is on the graph. " (Teacher Student-Centered Mathematics, John A. Van de Walle and LouAnn H. Lovin, 2006).
In this task students will use data gathered from frog jumps to create a line plot graph.

## ESSENTIAL QUESTIONS

- What parts are needed to make a complete chart, table, or graph? (title, labels, etc.)
- Why would you organize data in different ways?

## MATERIALS

- Student recording sheet
- 3 x 5 index card
- Scissors
- Rulers
- Masking Tape
- Internet Access
- Directions for origami frog http://www.ljhs.sandi.net/faculty/mteachworth/avid-information/origami-frog-lab-avid.pdf

## GROUPING

Individual/Partner Task

## TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

This task is designed to deepen students understanding of collecting and displaying data. In this task students will measure the leaps of origami frogs to the nearest inch and plot the measurement on a line plot graph.

### Part I

Have students discuss graphs and their purpose. On the board have examples of different types of graphs third graders are responsible for learning. Have students identify each graph and discuss each graphs purpose. Students can attach labels to graphs for a visual representation. Explain to students that they will be creating a line plot graph. Go into detail of what a line plot graph is and why it is used.

### Part II

Tell students that they are going to create a line plot graph showing how far Origami Frogs jump. Have students watch a brief YouTube video on Frog Jumping Contest to pique their interests. You can find a video of a contest on http://www.frogtown.org/ . View video prior to lesson to make sure it is appropriate. After viewing the video have students discuss what they saw. Display data of a frog jumping contest you "attended". Ask students how the data was gathered. Students should mention that the data is in inches. Briefly discuss measuring and using a ruler. Ask students which type of graph would best fit the data you collected from a frog jumping contest. If students do not automatically choose line plot graph, discuss the graph they chose and why it would not be appropriate and then discuss line plot graphs again. Model plotting two pieces of data from your data sheet.

### Part III

Explain to students that they will have their own frog jumping contest by creating Origami frogs out of paper. You can find a video of how to make an origami frog on http://www.youtube.com/watch?v=luG7_nzBHjI&feature=fvo&ad=21937675894 . The video is easy, however, you may want to write some directions down for your students. Also model each fold of the frog for clarification. Give students a few minutes to practice jumping with their paper frogs. Break students into groups of four to six. Students should take turns measuring the distance the frogs jump. Each group needs masking tape to mark the starting and end point, a ruler to measure the jump, and a recording sheet. Students should not measure their own jumps. Have students follow the directions on the student recording sheet.

## FORMATIVE ASSESSMENT QUESTIONS

- What parts are needed to make a complete chart, table, or graph? (title, labels, etc.)
- Why would you organize data in different ways?
- Why are graphs used to display data?
- What is an appropriate tool to use in order to measure in inches?

## DIFFERNTIATION

### Extension

- Have students create a frog out of larger paper to see if it makes a difference in the distance the frogs jump. Have students predict the outcome.

### Intervention

- Plot distances with students who are struggling. Guide them as they measure and plot data.

Name _____ Date _____

## Leap Frog

A. Each frog in the group will take one leap. Someone in your group will measure the distance your frog jumps. Be sure to place a piece of masking tape on the starting and end point of the jump. Use a ruler and measure the distance the frog jumps to the nearest inch. Record the distance on the chart below. Use the information collected in the table to create a group line plot graph.

| Frog Owner | Distance Jumped (nearest inch) |
|---|---|
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**B.** Using the data in the table above create a line plot graph for your group. Be sure to include all the elements of a line plot graph.

**C.** Create a line plot graph using all the data from each group.

**D.** Looking at your class data and your group data what conclusions can you draw? Were there any outliers?