Mystery Plots

Objective To provide experiences with data presented in line plots and stem-and-leaf plots.

Key Concepts and Skills
- Interpret line plots and stem-and-leaf plots. [Data and Chance Goal 2]
- Use landmarks to identify data sets. [Data and Chance Goal 2]
- Use landmarks to draw conclusions about data sets. [Data and Chance Goal 2]

Key Activities
Students interpret and then match the data in line and stem-and-leaf plots to given data descriptions.

Ongoing Assessment: Informing Instruction See page 396.
Ongoing Assessment: Recognizing Student Achievement Use journal page 176. [Data and Chance Goal 2]
Ongoing Assessment: Informing Instruction See page 397.

Materials
Math Journal 1, pp. 176–178
Study Link 6-3
Math Masters, p. 163
slate calculator

Advance Preparation
For the Math Message, make several copies of Math Masters, page 163 and cut them in half. For the optional Readiness activity in Part 3, cut Math Masters, page 429 (1-inch grid paper) into 1 inch by 9 inch strips.

Teacher’s Reference Manual, Grades 4–6 p. 169
Getting Started

**Mental Math and Reflexes**

Use the following problems to practice rounding numbers. Students write decimals from dictation then round the decimals to a specified place.

Suggestions:
- Thirty-two and six hundredths to the nearest whole number 32.06; 32
- Four and thirty-eight hundredths to the nearest tenth 4.38; 4.4
- Seven and eighteen hundredths to the nearest whole number 7.18; 7
- Seven and eighteen hundredths to the nearest tenth 7.18; 7.2
- Eighty-six and fifty-five hundredths to the nearest ten 86.55; 90
- Nine thousandths to the nearest hundredth 0.009; 0.01

**Math Message**

Take a Math Message half-sheet of paper. Use the stem-and-leaf plot to find the landmarks.

**Study Link 6-3 Follow-Up**

Ask partners to compare their answers and resolve any differences.

### Teaching the Lesson

#### Math Message Follow-Up

*(Math Masters, p. 163)*

Ask volunteers to name the nine data items shown in the stem-and-leaf plot. List the numbers in order on the board. 44, 47, 50, 50, 56, 58, 61, 63, and 65 Ask students to identify the minimum 44 in., maximum 65 in., range 21 in., median 56 in., and mode 50 in. Circle and label these numbers in the data list.

Draw a second version of the stem-and-leaf plot by rewriting each row of leaves in numerical order. *(See margin.)* Ask students which version of the stem-and-leaf plot makes it easier to find the landmarks and why. *The second version because data is ordered.*

#### Ongoing Assessment: Informing Instruction

Watch for students who have difficulty finding the median. Have them write the ordered data list from the board and cross off number pairs, one at each end, until they reach the middle number. This is the median. Then have them copy the second version of the stem-and-leaf plot and cross off pairs of leaves in the same way, by crossing off one leaf from the top and one leaf from the bottom, to identify the median.

#### Identifying Mystery Line Plots

*(Math Journal 1, pp. 176 and 177)*

Assign partners to complete journal pages 176 and 177 by matching the four sets of described data with the appropriate line plot. Emphasize that students are looking for the matches that make the most sense. Tell them that no plot is used more than once, and one of the plots is not used at all. Circulate and assist.
After ten to fifteen minutes, gather the class and discuss the answers:

- Data Set 1, hours of TV watched, is represented by Plot #2.
- Data Set 2, ages of younger siblings, is represented by Plot #5.

None of the other plots could describe Data Sets 1 or 2 because the numbers in those other plots are too large.

If Plot #5 represented TV hours, then more than half of the students watched TV for 5 or more hours the previous night. That’s possible, but unlikely. However, Plot #5 could represent hours on a nonschool day or when there is a significant national or international event, such as the Olympics.

If Plot #2 represented sibling ages, then no fifth grader would have a sibling aged 7 through 10. That’s possible, but unlikely. However, Plot #2 shows a reasonable range for grandmothers’ ages.

Plot #3 cannot represent heights because the largest numbers are too large. (Some students would be nearly 7 feet tall!) It does, however, show a reasonable range for grandmothers’ ages.

Plot #4 does not represent any of the data described on journal page 176. Ask students to describe any data that could be represented by Plot #4. Sample answers: Ages of the students’ mothers; average time in minutes spent on homework each night.

**Ongoing Assessment: Recognizing Student Achievement**

Use journal page 176, Problems 5 and 6 to assess students’ facility with interpreting data displayed in line plots. Students are making adequate progress if their writing demonstrates an understanding of the data’s meanings in relation to data descriptions. Some students may refer to data landmarks in their explanations.

**Identifying Mystery Stem-and-Leaf Plots**

(Math Journal 1, p. 178)

In this activity, similar to the previous one, students match data with stem-and-leaf plots instead of line plots. Students identify a data set that reasonably represents arm reach and then a data set for standing jump distances.

**Ongoing Assessment: Informing Instruction**

Watch for students who have difficulty reading the leaves as separate numbers in the stem-and-leaf plots. Have them list the numbers from the plot, use the list to help them answer the questions, and verify their selection of the median.
Most students will correctly identify Plot #1 as standing-jump distance and Plot #2 as arm reach. Expect a variety of explanations.

**Examples:**

- The smallest number in Plot #2 is in the 60s. That’s more than 5 feet, and many kids can’t jump that far. So Plot #2 must be arm reach.
- The smallest numbers in Plot #1 are in the 40s. Four feet is 48 in., so the smallest numbers are about 4 ft. Those numbers are too small to be arm reaches.
- I just held my arm up, and I found that I can reach about 15 in. above the top of my head. If you take 15 away from each number in Plot #2, you get numbers that are possible fifth graders’ heights in inches. So Plot #2 is arm reach.

---

**Playing Finish First**

(Math Journal 1, pp. 170 and 171)

Partners continue to collect data by playing Finish First. They record their results on journal page 171 and on the classroom tally sheet. For detailed instructions, see Lesson 6-2.

**NOTE** Remind students that the game data will be used in Lesson 6-6, so they must play their designated number of games by that time.

---

**Math Boxes 6•4**

(Math Journal 1, p. 179)

**Mixed Practice** Math Boxes in this lesson are paired with Math Boxes in Lesson 6-2. The skill in Problem 4 previews Unit 7 content.

**Writing/Reasoning** Have students respond to the following: Explain your method for finding the savings in Problem 5. Sample answer: I know that 20% is \( \frac{1}{5} \), so I divided each regular price by 5 to find the savings amount.

---

**Study Link 6•4**

(Math Masters, p. 164)

**Home Connection** Students match descriptions of data sets with line plots.
3 Differentiation Options

Finding the Median
(Math Masters, p. 429)

To explore finding the median using a concrete model, have students prepare and fold grid paper. Record the data set below on the board or a transparency. Give students 1 in. by 9 in. strips of 1-inch grid paper. They will use these strips to find the median of the data set.

Spelling Scores: 100, 83, 94, 93, 85, 70, 96, 94

Have students complete the following steps:

1. Write the numbers in the data set in order from smallest to largest on scrap paper.
2. Record the ordered numbers on the grid paper. Write one number in each cell, left-to-right. Cut off any cells that do not contain a value.
3. Fold the grid-paper strip in half.
4. Find the median. Explain that if a data set has an odd number of values, the number in the cell with the folded line is the median. If a data set has an even number of values, there will be two numbers separated by the folded line. The number halfway between these two numbers is the median.

When they have finished, ask students to describe how this strategy uses the definition of median. The median is the middle value in a data set. By folding the grid-paper strip in half, the fold is in the middle and identifies the middle of the data set.

Analyzing Spelling Test Scores
(Math Masters, p. 166)

To apply students’ understanding of the relationship between the median and the mean, have students analyze data to describe which is greater without actually finding the landmarks. When students have finished the Math Masters page, discuss their solutions.

Matching Mystery Plots
(Math Masters, p. 165)

Students match line plots to data descriptions. When they are finished, ask students to share their reasoning.