Objective To review data landmarks and methods for organizing data.

Key Concepts and Skills

- Organize data using a picture, graph, line plot, table, or list. [Data and Chance Goal 1]
- Identify data landmarks for data sets. [Data and Chance Goal 2]
- Compare and answer questions about data sets and their organization. [Data and Chance Goal 2]

Key Activities

Students organize and describe previously collected data and review the minimum, maximum, mode, median, and mean as data set descriptions.

Ongoing Assessment: Recognizing Student Achievement

Use journal page 165. [Data and Chance Goals 1 and 2]

Key Vocabulary

- minimum
- maximum
- mode
- median
- landmark
- line plot

Materials

- Math Journal 1, pp. 164 and 165
- Math Masters, p. 149
- Class Data Pad
- stick-on notes
- calculator

Rounding Numbers

Math Journal 1, p. 166
Calculator
Students round numbers using paper-and-pencil methods and then explain how to round numbers using a calculator.

Math Boxes 6-1
Math Journal 1, p. 167
Students practice and maintain skills through Math Box problems.

Study Link 6-1
Math Masters, p. 157
Students practice and maintain skills through Study Link activities.

Reading

Reviewing Data Landmarks

Math Journal 1, p. 158
Student Reference Book, pp. 119–121
Students review definitions and strategies for finding data landmarks.

ELL Support

Creating a Data Landmark Poster

Math Journal 1, p. 158
Differentiation Handbook, p. 143
per group: chart paper, stick-on notes, index cards or paper, colored pencils
Students make a poster to review and display the vocabulary for data landmarks.

Extra Practice

5-Minute Math

5-Minute Math™, pp. 34, 116, 198
Students practice finding the median in a set of data.

Enrichment

Plotting Arm Circumference

Math Masters, pp. 186A and 186B
Students use fraction data to make a line plot.

Advance Preparation

For Part 1, draw two number lines on the board and one on the Class Data Pad, labeling the points 0, 5, and 10. Leave enough room for small stick-on notes. Use the number lines on the board to plot the number of states students and adults have visited. The adult line may need to be longer than the student line. Use the line on the Class Data Pad with the Math Message. For Part 2, familiarize yourself with the rounding feature of your classroom calculators.

Getting Started

Mental Math and Reflexes
Dictate the following problems. Have students use thumbs up to indicate whether their magnitude estimate is in the tens, hundreds, or thousands. They use thumbs down for the place values that do not apply. Suggestions:

- ○○ 650 ÷ 6 hundreds
- ○○ 3.5 × 10 tens
- ○○ 9.24 × 1,000 thousands
- 35 × 100 thousands
- 7.780 ÷ 100 tens
- 24,925 ÷ 1,000 tens
- 10³ thousands
- 640 × 20 thousands
- 35 × 9.9 hundreds

Math Message
Predict how many states the average student has visited. Write your prediction on a stick-on note. Be prepared to explain the information you used to make your prediction.

Interactive whiteboard-ready ePresentations are available at www.everydaymathonline.com to help you teach the lesson.

Teaching the Lesson

Math Message Follow-Up
Have students position their stick-on notes on the Class Data Pad number line and explain the reason why they picked that number of states. Sample answer: I chose 2 states because the people I know go on vacation to the same place each year. Ask volunteers to find the minimum, maximum, mode, mean, and median for the displayed data. Add these landmark labels and values to the Class Data Pad.

Organizing the Class Data: States Students Have Visited
(Math Journal 1, p. 164; Math Masters, p. 149)

Refer students to Study Link 5-10, and ask them to report the number of states they have each visited. List these on the board or a transparency in the order they are presented. Students should also record these data on journal page 164.

Ask students how they might organize the class data so that the information being presented is easy to understand. A picture, graph, table, or list is usually easier to interpret than an unorganized set of data.

Working in small groups, students decide on a method to organize the class data. Each student then completes Problems 2 and 3 on journal page 164, using their group’s method. When most students have completed Problems 2 and 3, bring the class together to discuss the results.
Describing the Data

(Math Journal 1, p. 164)

Ask students to share their methods for organizing the data. Make sure several ways are presented, including a line plot. Three methods you might expect from students are shown in the margin.

Groups may have also arranged the data in numerical order, from smallest to largest or vice versa. Emphasize that ordering data helps the reader recognize the data landmarks, such as the minimum, maximum, mode, and median. To support English language learners, ask students to describe the similarities and differences between the median and the mode.

Ask students to print their personal counts for states visited on stick-on notes and attach them above the appropriate marks on the number line labeled States Students Have Visited. If the stick-on notes are carefully stacked, the result models a bar graph.

Ask students to compare their personal counts with the whole-class results. Encourage students to use descriptions of the shape of the stick-on note graph in their comparisons. Informal terms such as bunches, bumps, and far away from most are fine.

Have students compare the whole-class results with their predictions of the number of states visited by an average student. To support English language learners, discuss the meaning of the word average in this context. Ask questions like the following:

- Do the whole-class results support the predictions?
- What relationships can you describe between the predictions and the results?
- Are the shapes of the two graphs similar? Explain.
- What do the shapes of the two graphs suggest about the data landmarks? Do you see any connections between the shape of the graphs and the landmarks?

Then have students complete Problem 4 on the journal page.
Ongoing Learning & Practice

Organizing the Class Data: States Adults Have Visited
(Math Journal 1, pp. 164 and 165; Math Masters, p. 149)

Refer students to Study Link 5-10 and ask them to report the number of states visited by the adults they interviewed. As before, list these on the board or a transparency in the order they are presented. Students should also record these data on journal page 165.

Have partners complete the journal page. Circulate and assist.

Adjusting the Activity

Ask several volunteers to find the mean (average) number of states students have visited and circle this point on the displayed line plot. They should use calculators to add the counts recorded in Problem 1 on journal page 164 and then divide by the number of counts. Ask other volunteers to find the mean number of states adults have visited, using the counts recorded in Problem 1 on journal page 165, and circle this point on the displayed line plot.

Ongoing Assessment:
Recognizing Student Achievement

Use journal page 165, to assess students’ abilities to display data on a line plot, discuss the data’s organization, and identify minimum, maximum, mode(s), and median for data sets. Students are making adequate progress if they have correctly constructed the line plot and identified the landmarks. Some students may also describe the shape of the line plot in terms of the landmarks.

Rounding Numbers
(Math Journal 1, p. 166)

Students practice rounding numbers using paper-and-pencil methods. Then they explain how to round numbers using a calculator. Any calculator with the fix feature can be used with this activity.
Organize these data on the line plot below.

Find the following landmarks for the standing long jump data:

- **Mode:** 33 in.
- **Maximum:** 59 in.
- **Minimum:** 24 in.
- **Mean (average):** 39.5 in. (Use a calculator. Add the distances and divide the sum by the number of jumps. Round to the nearest tenth.)
- **Median:** 33 in.
- **Sample answers:**
  - Maximum: 59 in.
  - Minimum: 24 in.
  - Mean: 39.5 in.
  - Median: 33 in.

Differentiation Options

Make a bar graph for these data.

The Standing Long Jump

**Mixed Practice** Math Boxes in this lesson are paired with Math Boxes in Lesson 6-3. The skill in Problem 4 previews Unit 7 content.

**Writing/Reasoning** Have students respond to the following: If you extended the top number line in Problem 1, would 100 be one of the missing numbers? Explain.

No, each number increases by 7. If I add 7 to 71 four more times, the answer is 99, which is 1 less than 100.

**Study Link 6-1**

**Home Connection** Students construct a line plot and a bar graph from a set of given data. Then students identify the landmarks.

### 3 Differentiation Options

**REWINDING**

Reviewing Data Landmarks

To provide experience with the definitions of and methods for finding data landmarks, have students analyze the snack-survey data on journal page 158. Use pages 119–121 in the Student Reference Book.

Explain the following prominent features of a data set:

- **minimum**—smallest value
- **maximum**—largest value
- **range**—difference between the minimum and the maximum
- **mode**—most frequent value or values
- **median**—middle value
- **mean (average)**—quotient of the sum of the data set divided by the number of values in the set

Discuss the examples in the Student Reference Book, and have students find each landmark using the snack-survey data.

**Math Boxes 6-1**

(Math Journal 1, p. 167)

**Home Connection** Students construct a line plot and a bar graph from a set of given data. Then students identify the landmarks.

**Differentiation Options**

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**Math Masters, p. 157**

**Differentiation Options**

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Discuss the examples in the Student Reference Book, and have students find each landmark using the snack-survey data.

**Math Journal 1, p. 158**
Creating a Data Landmark Poster

(Math Journal 1, p. 158; Differentiation Handbook, p. 143)

To provide a visual reference for data landmark words, have students create a line plot using the snack-survey data from journal page 158. As a group, make a line plot of the snack-survey data using chart paper and stick-on notes. Assign the students the data landmark words to write on an index card or strips of paper, using a different-colored pencil for each word.

To complete the poster, ask students to discuss, find, and label the landmarks on the line plot with the cards or strips of paper. Consider having students use the Word Bank Template found on Differentiation Handbook, page 143. Ask students to write the terms minimum, maximum, range, mode, median, mean, and outlier; to draw a picture relating to each term; and to write other related words. See the Differentiation Handbook for more information.

5-Minute Math

To offer students more experience with finding the median in a set of data, see 5-Minute Math, pages 34, 116 and 198.

Plotting Arm Circumference

(Math Masters, pp. 186A and 186B)

To apply students’ understanding of line plots, have them create a line plot with measurements in fractions of a unit. When students have completed the line plot on Math Masters, page 186A, ask them to solve the problems on Math Masters, page 186B using the data in the line plot.
Sometimes measurements need to be very precise. When a blood pressure reading is taken, it is important that the proper cuff size is used. Blood pressure cuffs come in different sizes and are adjustable. Using a blood pressure cuff that is too small or too large can lead to inaccurate results. Before doing a blood pressure screening of the members of the fifth-grade running club, the school nurse measured the circumference of each student’s upper arm to the nearest $\frac{1}{8}$ inch. Measurements are shown in the table below.

<table>
<thead>
<tr>
<th>Student</th>
<th>Upper Arm Circumference (to the nearest $\frac{1}{8}$ in.)</th>
<th>Student</th>
<th>Upper Arm Circumference (to the nearest $\frac{1}{8}$ in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jason</td>
<td>$5\frac{1}{4}$</td>
<td>Robin</td>
<td>$6\frac{3}{8}$</td>
</tr>
<tr>
<td>Mike</td>
<td>$6\frac{1}{8}$</td>
<td>Javon</td>
<td>6</td>
</tr>
<tr>
<td>Kylie</td>
<td>$6\frac{1}{2}$</td>
<td>Beatrice</td>
<td>$5\frac{1}{4}$</td>
</tr>
<tr>
<td>Peter</td>
<td>$6\frac{1}{8}$</td>
<td>Charlie</td>
<td>$6\frac{1}{8}$</td>
</tr>
<tr>
<td>Diego</td>
<td>5</td>
<td>Shawn</td>
<td>$6\frac{3}{8}$</td>
</tr>
<tr>
<td>Juan Carlos</td>
<td>6</td>
<td>India</td>
<td>6</td>
</tr>
<tr>
<td>Lisa</td>
<td>$5\frac{1}{2}$</td>
<td>Katy</td>
<td>$6\frac{3}{8}$</td>
</tr>
<tr>
<td>Pamela</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Make a line plot in the grid below to display the arm circumference measurements. Begin by completing the labeling of the x-axis. Use these data and the completed line plot to answer the questions on the next page.
Arm Circumference Data continued

Use the line plot on *Math Masters*, page 186A to answer the questions.

1. What is the minimum arm circumference of the students in the fifth-grade running club? _____ in.

2. How much smaller is Kylie’s upper arm circumference than the club’s maximum? _____ in.

3. What is the range in arm circumference of the members of the fifth-grade running club? _____ in.

4. a. What is the median of the data set? _______ in.

   b. How much greater is the median arm circumference than the minimum arm circumference? _______ in.

5. What is the mode (or modes) for the data set?

6. What is the mean arm circumference measurement? _____ in.

7. On the day of the blood pressure screening, the nurse brought a cuff that is made for people with arm circumferences between 5\(\frac{1}{8}\) in. and 6\(\frac{3}{4}\) in. What fraction of the fifth-grade running club was able to use that cuff?

8. Suppose a new member, Denise, joins the club. The circumference of her upper arm is 6\(\frac{1}{2}\) in. Tell whether each of these club’s landmarks will increase, decrease, or stay the same. Determine your answers without doing any calculations.

   a. Mean: ______________________

   b. Median: ______________________

   c. Mode: ______________________