50 Leveled Math Problems

150 Problems Total

Anne M. Collins
Table of Contents

Introduction
  Problem Solving in Mathematics Instruction .......... 5
  Understanding the Problem-Solving Process .......... 7
  Problem-Solving Strategies .......................... 12
  Ask, Don’t Tell .................................. 14
  Differentiating with Leveled Problems ............... 15
Management and Assessment .................................. 18
How to Use This Book .................................. 22
Correlations to Standards ............................... 26

Leveled Problem-Solving Lessons
  Operations and Algebraic Thinking
    In What Order? .................................. 32
    Order Counts ................................... 34
    Number Patterns ................................ 36
    Geometric Patterns ............................. 38
    How Else Might I Look? ......................... 40
    Where Am I? .................................. 42
    How Do I Change? .............................. 44
    What’s Our Relation? ......................... 46

  Number and Operations in Base Ten
    Name My Number ................................ 48
    Rectangular Products ........................... 50
    Whatever Remains .............................. 52
    Grouping or Sharing? ......................... 54
    Dealing with Decimals ......................... 56
    Expanded Form ................................ 58
    Travel Expenses ................................ 60
    Computing with Decimals ...................... 62
    Dizzying Decimals .............................. 64
    Estimating Decimals ........................... 66
    About How Much? .............................. 68

  Number and Operations—Fractions
    Where Do I Fit? ............................... 70
    Ribbons and Bows .............................. 72
    Fractional Sums ............................... 74
# Table of Contents (cont.)

What’s the Difference? ........................................... 76
It’s Close to What? ............................................... 78
More or Less ....................................................... 80
Fractional Areas .................................................. 82
The Product Is Smaller .......................................... 84
Fair Sharing, Equal Groups .................................. 86
Map Reading ....................................................... 88

**Measurement and Data**

Fill It Up .......................................................... 90
How Spacious Is It? ............................................. 92
Cubic Views ....................................................... 94
Volume in Practice .............................................. 96
What’s My Unit? .................................................. 98
Metrically Speaking ............................................. 100
How Much Is There? ............................................. 102
All in a Line ....................................................... 104
What Is the Favorite? ........................................... 106
Stem-and-Leaf Plots ............................................. 108
What Does It Mean? ............................................. 110
The Plot Thickens ............................................... 112
One or the Other ............................................... 114

**Geometry**

Congruency ..................................................... 116
Classifying Figures ............................................. 118
Plots A Lot ....................................................... 120
Flips, Slides, and Turns ....................................... 122
What Is the Angle? .............................................. 124
Sort It Out ....................................................... 126
Geometric Nets .................................................. 128
Graph It ......................................................... 130

**Appendices**

Appendix A: Student Response Form ..................... 132
Appendix B: Observation Form ............................. 133
Appendix C: Record-Keeping Chart ....................... 134
Appendix D: Answer Key ..................................... 135
Appendix E: References Cited .............................. 142
Appendix F: Contents of the Teacher Resource CD .... 143
**Stem-and-Leaf Plots**

### Standards
- Understands that a summary of data should include where the middle is and how much spread there is around it
- Understands that data come in many different forms and that collecting, organizing, and displaying data can be done in many ways

### Problem-Solving Strategy
Organize information in a picture, list, table, graph, or diagram

### Materials
- Stem-and-Leaf Plots (page 109; stemleaf.pdf)
- connecting cubes
- pan balances or balance beams
- Student Response Form (page 132; studentresponse.pdf) (optional)

### Activate
1. Have students explain to you everything they can about organizing data.
2. Ask students to make a list of their classmates’ birthdays (use only the day, for example, for August 10, use only 10). Have students put the data in order from least to greatest.
3. Show students how to create a stem-and-leaf plot using some of the data they collected. Have students complete the plot for the rest of the data set.
4. Invite several students to share their solutions.

### Solve
1. Distribute copies of Stem-and-Leaf Plots to students. Have students work alone, in pairs, or in small groups.
2. As students are working on the problems, pose clarifying questions to help you uncover students’ thinking.

3. Ask students to explain the difference between the mean and median and to give an example of when it is more important to use the median and when it is more important to use the mean.

### Debrief
1. Explain how the stem-and-leaf plot uses place value.
2. How might you check the median in a stem-and-leaf plot?

### Differentiate
Consider assigning an exit-card task such as the following: Define the term mean or average in your own words. Give an example to support your answer.
The data in the table was gathered to display a school’s basketball scores over the last season. The coach has asked you to make a stem-and-leaf plot for this data. How might it look?

```
65  73  68  75  73  82  68  57  74  61  67  35
```

Mr. Wiley wants to know whether the mean, median, or mode will be the best measure to use to describe how well his students did on his math test. Which should he use and why?

```
1
2  5
3
4  0
5  5  5
6  0  5
7  0  0  0  5  5  5
8  0  0  0  5
9  5  5
10  0
```

The Main Street School Eagles are competing against the Pumas to see which group can do the most squats in a two-minute period. They represented their data in a double stem-and-leaf plot.

```
<table>
<thead>
<tr>
<th>Eagles</th>
<th>Stems</th>
<th>Pumas</th>
</tr>
</thead>
<tbody>
<tr>
<td>5  4  4  3  3  2  3  0  1  2  4  4  8  0  1  2  4  4  8  6  0  1  4  5  6  5  6  5  6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8  8  8  7  6  4  1  2  2  6  7  0  1  2  3  3  3  4  5  6  0  1  2  3  3  3  4  5  6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6  4  3  1  1  5  1  3  3  3  4  5  6  0  0  1  4  5  6  5  6  5  6  5  6  5  6  5  6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

- What is the mode for the Eagles? Pumas?
- What is the median for the Eagles? Pumas?
- What can you say about the two teams based on the data?