What is A Stem and Leaf Plot Diagram?

Data can be shown in a variety of ways including graphs, charts and tables. A Stem and Leaf Plot is a type of graph that is similar to a histogram but shows more information. The Stem-and-Leaf Plot summarizes the shape of a set of data (the distribution) and provides extra detail regarding individual values. The data is arranged by place value. The digits in the largest place is referred to as the stem and the digits in the smallest place are referred to as the leaf (leaves). The leaves are always displayed to the left of the stem. Stem and Leaf Plots are great organizers for large amounts of information.

What Are They Used For?

They are usually used when there are large amounts of numbers to analyze. Series of scores on sports teams, series of temperatures or rainfall over a period of time, series of classroom test scores are examples of when Stem and Leaf Plots could be used.

For example: Here are the test scores of 26 4th. graders:

64, 82, 85, 99, 96, 81, 97, 80, 81, 80, 84, 87, 98, 75, 86, 88, 82, 78, 81, 86, 80, 50, 84, 88, 83, 82

Your first step should be to place the numbers in order from least to greatest.

50, 64, 75, 78, 80, 80, 80, 81, 81, 81, 82, 82, 82, 83, 84, 84, 85 86, 86, 87, 88, 88, 96, 97, 98, 99

Now create your graph:

The numbers on the left side of the vertical line are the stems. The numbers on the right side are the leaves. In our graph, the stems are the tens digits of the scores on the test, and the leaves are the unit digits. In this case, 9/6 represents a score of 96.
A stem and leaf display of the data is shown in Figure 1. The left portion of Figure 1 contains the stems. They are the numbers 3, 2, 1, and 0, arranged as a column to the left of the bars. Think of these numbers as 10’s digits. A stem of 3 (for example) can be used to represent the 10’s digit in any of the numbers from 30 to 39. The numbers to the right of the bar are leaves, and they represent the 1’s digits. Every leaf in the graph therefore stands for the result of adding the leaf to 10 times its stem.

![Figure 1. Stem and leaf display of the number of touchdown passes.](image)

<table>
<thead>
<tr>
<th>Table 1. Number of touchdown passes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>37, 33, 33, 32, 29, 28, 28, 23, 22, 22, 21, 21, 20, 20, 19, 19, 18, 18, 18, 16, 15, 14, 14, 14, 12, 12, 9, 6</td>
</tr>
</tbody>
</table>

- Complete a stem-and-leaf plot for the following list of grades on a recent test:

  73, 42, 67, 78, 99, 84, 91, 82, 86, 94

I'll use the tens digits as the stem values and the ones digits as the leaves. For convenience sake, I'll order the list, but this is not required:

  42, 67, 73, 78, 82, 84, 86, 91, 94, 99

Since I know where these data points came from ("a recent test"), I'll use a title. Then my plot looks like this:

<table>
<thead>
<tr>
<th>Test grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>stem</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
</tbody>
</table>
Range - the difference between the highest and lowest numbers
2, 6, 8, 12, 16, 16, 18, 18, 21, 24

Mode - the number that occurs the most
2, 6, 8, 12, 16, 16, 18, 18, 21, 24
16 is the mode for this example

**NOTE**: there can be more than one mode
2, 6, 8, 12, 16, 16, 18, 18, 21, 24
16 AND 18 are the mode

**NOTE**: there can be no mode
2, 6, 8, 12, 16, 18, 21, 24

Mean - is the average
Add all the numbers and divide by how many numbers there are
2, 6, 8, 12, 16, 18, 21, 24

\[
\frac{2+6+8+12+16+18+24}{7} = \frac{72}{7} = 12\frac{2}{7}
\]

Median - is the middle number after arranging the numbers in order from least to greatest
2, 6, 8, 12, 16, 18, 21, 24, 28 ODD NUMBER
2, 6, 8, 12, 16, 19, 21, 24, 28, 30 EVEN NUMBER

\[
\frac{16+19}{2} = 17.5
\]

**RELATIVE FREQUENCY** - is how often an outcome occurs compared to the total number of outcomes. It can be written as a fraction, decimal or percent
2, 6, 8, 12, 16, 16, 18, 18, 18, 21, 24

The relative frequency for the number 12 occurring is \( \frac{3}{12} \) or \( \frac{1}{4} \) or 0.25 or 25%
We can also use the information to make a Histogram

2, 6, 8, 12, 16, 16, 16, 18, 18, 18, 21, 24