

TAKE IT TO THE MAT

A NEWSLETTER ADDRESSING THE FINER POINTS OF MATHEMATICS INSTRUCTION

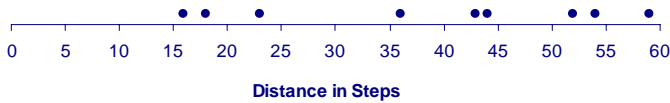


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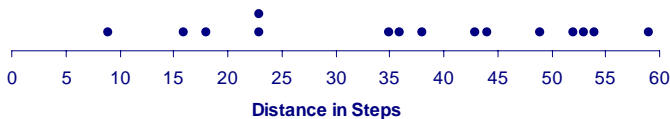
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In this month's *Take It to the MAT*, we will continue the discussion of the scenario begun in the February 2004 issue. Recall, we were interested in how close it is from the staff lounge to the respective classrooms as measured in steps. This time, we will study the *distribution* of distances of a set of rooms, rather than compare individual distances.

We'll begin as last time, considering only the third grade classrooms. How could we organize the data so we can see where the data is concentrated and how it is spread out? That is, how is it *distributed*? A line plot is the first thing that comes to mind. One is shown below.



Hmmm, not very exciting. It tells us about as much as the bar graph did last time. No two rooms have the same distance. What if we add the six 4th grade rooms to the list?



Room	Number of Steps
31	36
32	44
33	23
34	18
35	16
36	54
37	59
38	52
39	43
41	9
42	35
43	49
44	38
45	23
46	53

That doesn't add much. The reason is that the data are so spread out, a line plot may not tell us everything we want to know. One answer is a *stem-and-leaf plot*.

A *stem-and-leaf plot*, sometimes called a *stemplot*, is a way of organizing data into a graph based on place value. In our case, the distances are two-digit numbers—tens and ones. We create a stem-and-leaf plot by making a column of *stems* based on a particular place value. We will use tens as our stems. Since our data range from 9 to 59, the stems will be 0 through 5 because our distances have between 0 and 5 tens. To the right of our column of stems we draw a line to separate them from the leaves. (Figure 1)

Stems	Leaves
0	
1	
2	
3	
4	
5	

Figure 1

Stems	Leaves
0	
1	8
2	3
3	6
4	4
5	

Figure 2

Now, we look at the ones in each of the measurements and write that on the right side of the dividing line. Reading our data from the top down, our first measurement is 36 steps. Write a leaf of "6" to the right of the "3" stem. The next is 44 steps; write a "4" leaf to the right of the "4" stem. The first four data are shown in Figure 2.

Stems	Leaves
0	
1	86
2	3
3	6
4	4
5	492

Figure 3

Stems	Leaves
0	9
1	86
2	33
3	658
4	439
5	4923

Figure 4

When we reach the fifth observation, 16 steps, we will write the leaf of "6" to the right of the leaf of "8" that is already there. Similarly, the next three data—54, 59, and 52—all have leaves to the right of the "5" stem. (Figure 3) (Note: maintain equal spacing of the leaves!)

Filling in the rest of the data we get our completed stem-and-leaf plot. Note that the distance 9 steps has no tens, so its leaf of "9" ones is placed on the "0" tens stem. (Figure 4)

Stems	Leaves
0	9
1	68
2	33
3	568
4	349
5	2349

Key: 4|3 means 43 Steps

Figure 5

Finally, we rewrite the leaves in numerical order to make the plot easier to read, then add a "key" so we know what the values represent. (Figure 5) It's clear from the key that stems are tens (of steps) and leaves are ones.

So, what does the plot tell you about the distances from the lounge to the classrooms?