TAKE IT TO THE MAT

A NEWSLETTER ADDRESSING THE FINER POINTS OF MATHEMATICS INSTRUCTION

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When using stem-and-leaf plots, whether of a single set of data or comparing two (or more) sets of data, sometimes the shape of a distribution is difficult to discern. One of the reasons for this is that the data are concentrated in a small number of stems. In the back-to-back stemplot shown at right, the shape of the distribution of plain candy masses is unclear due to the fact that there are a lot of data in just four stems. In this issue of *Take It to the MAT*, we'll discuss how to make things clearer in a stemplot.

Plain Mass (g)		Crispy Mass (g)
	5	8
9	6	4669
977664	7	1235569
998887777777777666666665555444333221	8	001111222456778
888555433222110000	9	234457
	10	33356777789
	11	1678
	12	234
	13	6
	14	
	15	
	16	6

Left side: 9|6 represents 0.69 g
Right side: 6|9 represents 0.69 g

Determining the shape of the distribution of plain candy masses might be easier by "splitting" the stems. What we will do is divide each stem into two stems. For example, the "7" stem in the first stemplot contains all measurements from 0.70–0.79 grams. At right, there are two "7" stems, the first's leaves correspond to masses from 0.70–0.74 g and the second's list the masses from 0.75–0.79 g. Each split stem has half of the range of the orginal stem.

Plain Mass (g)		Crispy Mass (g)
	5	8
	6	4
9	6	669
4	7	123
97766	7	5569
444333221	8	0011112224
998887777777777666666665555	8	56778
433222110000	9	2344
888555	9	57
	10	333
	10	56777789
	11	1
	11	678
	12	234
	12	
	13	
	13	6

Hi: 1.66 g

Left side: 9|6 represents 0.69 g
Right side: 6|9 represents 0.69 g

The distribution of the plain candy masses is clearer now. The shape is fairly symmetric and it is centered in the high eighty-something hundredths—probably 0.86 or 0.87 g. It does not appear to have any outliers.

As for the crispy candies, the double peak is still there; splitting the stems did not eliminate it. The distribution of crispy masses is bimodal, centered around 0.90 grams, and has one or two outliers. The source of the bimodality remains a mystery.

Note that the 1.66 g crispy candy is clearly an outlier, but is not shown on the stemplot except as a footnote. Sometimes outliers will be listed separately if including them will create a large amount of empty space at the end of a plot. If the outlier were included normally, there would be 5 empty stems between the high 1.3 g stem and the high 1.6 g stem. Keeping the 1.36 g observation in the plot is a judgment call, but the authors thought it was close enough to the other observations to include it.

What other questions does this stem-and-leaf plot trigger?