TAKE IT TO THE MAT

A NEWSLETTER ADDRESSING THE FINER POINTS OF MATHEMATICS INSTRUCTION

Southern Nevada Regional Professional Development Program

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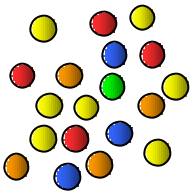
With this issue of *Take It to the MAT*, the Regional Professional Development Program begins its fourth year of providing teachers with a periodical addressing mathematics instruction. We hope you find the topics interesting and useful. —Eds.

Let's say you have a set of data. What does one do with it? Perhaps one might create a table, construct a graph, or calculate some summary value for the data. All of these are valid steps, usually done in the order listed. However, before one does any of them, one should understand what the data are.

Shown at right are the contents of a bag of colored candies. What data could we gather from these candies? Perhaps we are interested in the colors of the candies. What would our raw data look like?



If we are interested in the colors, the raw data are: *yellow, red, yellow, red, orange, blue, red, yellow, yellow, green, orange, yellow, yellow, red, blue, orange, blue, orange, yellow*. There are 19 individual observations, 4 of which are red, 1 green, 3 blue, 4 orange, and 7 yellow. These data are known as *categorical* or *qualitative*, i.e. they can be placed into categories or described by some intrinsic quality.

When asked what the data are, some students may say, "Red, green, blue, orange, and yellow." Other students, perhaps having done calculations with data in the past, say, "Four, one, three, four, and seven." Unfortunately, both notions are incorrect. There are 19 individuals in the set so there must be 19 data values. We are interested in the candies' colors, so the 19 data must be colors of the 19 candies and noted in the previous paragraph.

Another way to think about it is to open the bag of candies but not dump out the contents. Instead, pull one candy out of the bag and record its color. Repeat this process until the bag is empty. Each datum is the drawn candy's color. If one were to know ahead of time what colors were present, one may record the data and organize it simultaneously with a tally table, but the actual data are still the 19 individual candies' colors.

Color	Tally	Count
Red	////	4
Green	/	1
Blue	///	3
Orange	////	4
Yellow	~~////~~ //	7

If data are not *categorical/qualitative*, they are *numerical/quantitative* data. These data are derived from counting or measuring. One example would be the weight of each candy in the bag.

Now, one may make the case that we have *counts* of our candies, as shown in the table. Yes, we do, but only *after* we have organized the *raw* data. We are interested in how the *colors* are distributed. The bag is opened, a candy is selected, and what is recorded? The color! The counts (or frequencies, or tallies, or whatever we wish to call them) are only an indication of how many times each *color* occurred—they are not the data themselves.

Frequently (no pun intended), we organize raw, categorical data into a frequency table to make it easier to read. Can you imagine the list of raw data from a 2-pound bag of colored candies? It would take up this entire newsletter! Yet, even after we organize it into a table like the one above, the data are still categorical.