A Penny's Worth of Mass

How can a precise measurement reveal information that might otherwise go unnoticed?

When using the electronic balances, make sure that the balance is zeroed before placing anything on the measuring pan. Also make sure the mode is set to grams [g].

Mass is a measure of how much stuff, or matter, something possesses. Mass is a basic or fundamental property of something. Mass is measured in grams or kilograms (1000 grams).

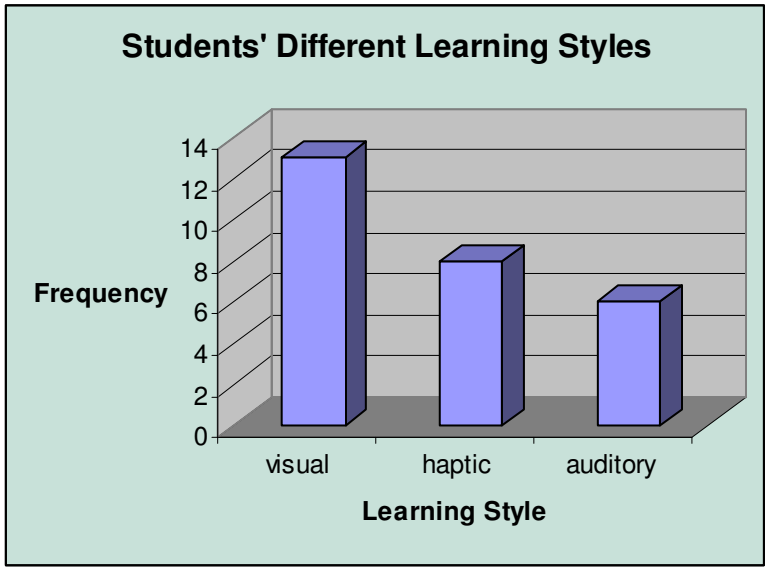
Take 30 pennies from the container, and determine the mass of each one, using the electronic balance. Make an appropriate data table to record these measurements.

One way to gain some meaning from a set of data is represent that data graphically. If we are looking for similarities and differences in a set of measurements, a good graph to use is a histogram.

A histogram is a vertical bar graph. The horizontal axis is scaled for the measurement made. In this case the horizontal axis should be labeled "Mass in grams." The scale for the axis should be set up so that all values measured can be plotted.

The vertical axis is always labeled "Frequency," and refers to the number of times a measurement appears in the data.

The number of bars plotted is the number of different measurements or categories. Here's a sample:



Your completed histogram should include these components:

1. Meaningful title that describes the experiment
2. Vertical axis labeled “Frequency”
3. Horizontal axis labeled with the measurement or category [Mass of penny in grams]
4. Both axes should be scaled with numbers appropriate to the measurements made. For example, if the masses range from 5 grams to 20 grams, that should be the scale of the horizontal axis, rather than from 0 to 100.
5. The graph should be scaled appropriately so that it fills the page.

After your histogram is completed, examine it to draw some conclusion about the data. For example, in the Learning Styles histogram, one conclusion could be, “More students are visual learners than any other learning style.”

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Summing up

1. What information about the pennies is revealed by the histogram that is not apparent by simply looking at them?

2. How do you account for the measured differences of the masses of the coins?

3. What other data could be collected and analyzed to account for the measured differences of the coins?