



Contrasting the median and mean: Teacher notes

<http://topdrawer.aamt.edu.au/Statistics/Good-teaching/Data-reduction/Mean-median-and-mode/Contrasting-the-median-and-mean>

Overview

The aim of this lesson is to reinforce for students the difference in the mean and median. They will begin by considering the two sets of ten data values on the worksheet. The students calculate the median and mean, and compare them. After collecting (or obtaining) a much larger data set they create stacked dot plots of the data, and mark the mean and median for comparison. This process is carried out in two contexts: one where symmetric data are expected and one where the data are expected to be skewed.

Although the data can be collected by you and the students themselves, it is also possible to use data provided on *Medians and means: Data* (<http://topdrawer.aamt.edu.au/Statistics/Downloads/Contrasting-medians-and-means-Data>).

Objectives

- Reinforce definitions of mean and median
- Compare the two statistics in different contexts
- Write summaries of findings

Materials

- Paper, pencils, rulers, calculators
- Device to measure height (if collecting class data)
- Copies of: *Medians and means: Data*
Contrasting medians and means: Student worksheet
- Software for creating graphs (optional, e.g. Excel or TinkerPlots)

Lesson plan

Preliminary activity

1. Decide whether you are going to have the class collect the data using *Contrasting medians and means: Student worksheet*, or use the data provided in *Medians and means: Data*. Perhaps ask the students to bring to school a random collection of 10-cent pieces (a few each) or collect a random set of 100 10-cent pieces yourself, so the coins will have a range of dates.



Introduction

2. Review with students the definitions of mean, median and mode. Stress that in most investigations the mean and median are more meaningful but sometimes, like in judging the popularity of TV shows, the mode is used to describe average or typical.
3. Introduce the collection of data of two types: data where we expect the mean and median to be close together, and data where they are likely to be separated. One data set will be the collection of 100 10-cent coins and the other will be the heights of students (to be collected as part of the lesson or earlier, perhaps for another purpose, or found in *Medians and means: Data*).

Exploration

4. Students work through the instructions on *Contrasting medians and means: Student worksheet*. You can use your own data or the data provided in *Medians and means: Data*.

Wrap-up

5. Discuss with students the differences in the relative behaviour of the mean and median for the two data sets. If not done previously, introduce the term 'symmetric' for the arm span graph and 'skewed' for the coin dates graph.
6. Ask whether the mean or median represents the middle of the coin data set 'better'. For most purposes for skewed data sets the median, as the 'middle' of the data, would be considered a better representation of the data set.

Answers

The plots for the two data sets given on the student worksheet are shown below (created in TinkerPlots). The \perp symbol is the median and the Δ is the mean. The symbols overlap on the top plot.

