

## The Mathematical World > Averages and Comparisons

### Research on Student Learning

The concept of the mean is quite difficult for students of all ages to understand even after several years of formal instruction. Several difficulties have been documented in the literature: Students of all ages can talk about the algorithm for computing the mean and relate it to limited contexts, but cannot use it meaningfully in problems. <sup>[1]</sup> Difficulty is influenced by the problem format, the particular numbers in the problem, the types of ratios used, and the problem situation. <sup>[2]</sup> Some middle-school students cannot use the mean to compare two different-sized sets of data. <sup>[3]</sup> High-school students may believe the mean is the usual or typical value. <sup>[4]</sup> Students (or adults) may think that the sum of the data values below the mean is equivalent to the sum above the mean (rather than that the total of the deviations below the mean is equal to the total above). <sup>[5]</sup> Research suggests that a good notion of representativeness may be a prerequisite to grasping the definitions for measures of location like mean, median, or mode. Students can acquire notions of representativeness after they start seeing data sets as entities to be described and summarized rather than as "unconnected" individual values. This occurs typically around 4th grade. <sup>[6]</sup>

Research suggests students should be introduced first to location measures that connect with their emerging concept of the "middle," such as the median, and later in the middle-school grades, to the mean. Premature introduction of the algorithm for computing the mean divorced from a meaningful context may block students from understanding what averages are for. <sup>[7]</sup>

### References

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