

# MEASURES OF SPREAD: UNDERSTANDING VARIABILITY

Math standards: 6.SP.B.5, 7.SP.A.2, A1.S-ID.A.2, A2.S-ID.A.4, QR.SPR.4

Students explore data by examining its distribution, identifying patterns and deviations, and using measures of spread to compare variability, make inferences, and model real-world contexts accurately.

## Range

**Meaning:** Captures the full span of data  
**Interpretation:** Helps compare variability between data sets. A large range may signal outliers. Variability shows consistency: low variability means values are close together, high variability means they're widely spread.

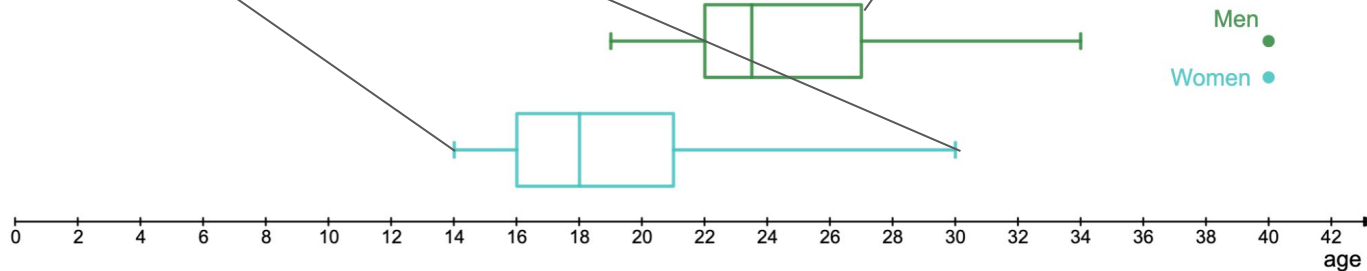
**Women:** lowest 14, highest 30  $30-14 = 16$

## Interquartile Range (IQR)

**Meaning:** Focuses on the middle 50% of data  
**Interpretation:** Shows the spread of the middle 50% of data, disregarding extremes and outliers. It's more reliable than range for skewed data.

**Men:** Q1:22 Q3:27  $27-22 = 5$

## Ages of Olympic All Around Champions in Gymnastics



<https://slowrevealgraphs.com/2023/06/23/age-of-olympic-gymnastics-all-around-champions-by-gender/>

## Mean Absolute Deviation (MAD)

**Meaning:** Shows the average distance from the mean  
**Interpretation:** Makes variability easy to interpret, useful for comparing data sets, and assessing consistency. A smaller MAD means data points are closer to the mean (more consistent), while a larger MAD means greater spread.

## Standard Deviation (SD)

**Meaning:** Shows how far data points typically are from the mean  
**Interpretation:** Helps measure variability, assess consistency, compare data sets, support statistical analysis, and detect unusual variation.

## Difference between MAD and SD

MAD = simpler, less affected by extreme values, good for basic understanding of variability.  
 SD = more precise for statistical work, emphasizes larger deviations because of squaring.