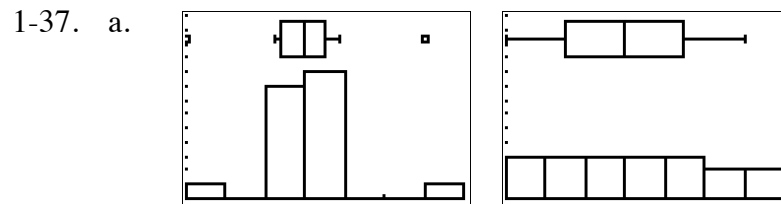
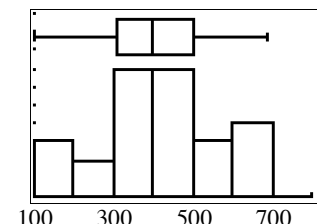


Lesson 1.2.2



- b. Mean and median are 40 for both sugars.
- c. Sugar P has much more variability or spread. Statistics that numerically measure spread include range, interquartile range, mean absolute deviation, and standard deviation. Answers will vary as to which data set is better.
- 1-38. a. The range for both sets is $60 \mu\text{m}$. Even when there are no outliers, the range considers just the extremes rather than where the bulk of the data falls. The extremes might not represent the spread of the bulk of the data well.
- b. Sugar P has much more variability. The mean absolute deviation of Sugar W is $7.05 \mu\text{m}$, while mean absolute deviation for Sugar P is $16.3 \mu\text{m}$.
- c. The mean absolute deviation is based on the mean. The mean may not be representative of the center if the data has outliers or is skewed.
- d. Sugar P has much more variability. The IQR for Sugar W is $11 \mu\text{m}$, while the IQR for Sugar P is $30 \mu\text{m}$.
- 1-39. The standard deviation's units are always the same as your original data.
- 1-40. Sugar P has much more variability. The variance for Sugar W is $\frac{2240}{19} = 117.9 \mu\text{m}^2$ with a standard deviation of $\sqrt{117.9} = 10.86 \mu\text{m}$ while the variance for Sugar P is $\frac{6766}{19} = 356.1 \mu\text{m}^2$ with a standard deviation of $\sqrt{356.1} = 18.87 \mu\text{m}$.
- 1-41. Sugar W has $\sigma_x = 10.86 \mu\text{m}$, while Sugar P has $\sigma_x = 18.87 \mu\text{m}$.

- 1-42. See graph at right. The distribution of lead in ppm is symmetric with no outliers (as determined by the modified boxplot). The mean is 398 ppm with a population standard deviation of 157 ppm. The counts are rounded to the nearest 10 ppm.



- 1-43. a. 13 and any two greater ages
- b. 2 students
- c. If the data is arranged in order from least to greatest, the median is the number in the middle; if two numbers share the middle, then the median is the mean of those two numbers.

- 1-44. a-*iv*, b-*ii*, c-*v*, d-*i*, e-*iii*. *b* is the only histogram with a narrow range, so it matches to *ii*. The two skewed histograms are straightforward to match. *c* has a uniform distribution, so the quartiles on the boxplot must be of even length, as in *v*. *d* has a lot of data at the two edges, and the data in the middle is more spread out, so the “whiskers” of the boxplot must be narrow, and the box must be wide, as in *i*.

- 1-45. See graph at right. The distribution is symmetric with no outliers. The mean is 50.7 cm and the population standard deviation is 2.6 cm. The lengths were measured to the nearest tenth of a centimeter.

