|  |  |  |
| --- | --- | --- |
|  | **Hot Dogs!** | https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcTAyZeyCu7Rggxy7l4CYul2sI7bVnXABpZK7-rg4yvYtlSecBES |

Part I Sodium (in mg) per Hot Dog

Consumer Reports, in June, 1983, reported on the sodium content of major hot dog brands. The table and box plots below compare the calories for 20 beef hot dogs and 17 poultry hot dogs.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |

|  |  |
| --- | --- |
|  | Sodium Content per Hot Dog |
| Beef | Poultry |
| Sample Size (n) | 20 | 17 |
| Minimum | 253 | 357 |
| First Quartile | 320.5 | 383 |
| Median | 380.5 | 430 |
| Third Quartile | 478 | 528 |
| Maximum | 645 | 588 |

 |

1. Write a paragraph comparing the sodium content of beef hot dogs and poultry hot dogs. (Be sure to compare shape, center and spread in context!)
2. The samples hot dog brands used in the report by Consumer Reports, while including many of the major brands, was not a random sample of all brands on the market in 1986. Just for the purposes of this task, let’s assume that the two samples of hot dogs were selected randomly from hot dogs currently on the market. If we had really selected the brands of hot dogs randomly from all hot dog brands currently available on the market, would you think that beef hot dogs typically have less sodium than poultry hot dogs? Explain your decision using information from the comparative box plot graph, the summary statistics, and your paragraph above.

Part II Calories per Hot Dog

In addition to reporting on sodium content of major hot dog brands, Consumer Reports also includes information about the number of calories per hot dog for each brand. The table below shows the number of calories for the 20 brands of beef hot dogs and the 17 brands of poultry hot dogs. A dot plot of the number of calories for each type of hot dog is also provided.

|  |  |  |
| --- | --- | --- |
| **Beef Hot Dogs** |  | **Poultry Hot Dogs** |
| **Calories** | **Absolute****Deviation**$$|x-\overbar{x|}$$ |  | **Calories** | **Absolute****Deviation**$$|x-\overbar{x|}$$ |
| 186 |  |  | 129 |  |
| 181 |  |  | 132 |  |
| 176 |  |  | 102 |  |
| 149 |  |  | 106 |  |
| 184 |  |  | 94 |  |
| 190 |  |  | 102 |  |
| 158 |  |  | 87 |  |
| 139 |  |  | 99 |  |
| 175 |  |  | 107 |  |
| 148 |  |  | 113 |  |
| 152 |  |  | 135 |  |
| 111 |  |  | 142 |  |
| 141 |  |  | 86 |  |
| 153 |  |  | 143 |  |
| 190 |  |  | 152 |  |
| 157 |  |  | 146 |  |
| 131 |  |  | 144 |  |
| 149 |  |  |  |  |
| 135 |  |  |  |  |
| 132 |  |  |  |  |



1. Based on the dot plot above, which type of hot dog appears to have the most calories?
2. Does one type of hot dog appear to have greater variability in its number of calories than the other? Explain.
3. Calculate the mean and mean absolute deviation (MAD) calories for each group.

|  |  |
| --- | --- |
| Beef | Poultry |
| Mean = \_\_\_\_\_\_\_\_\_\_\_  | Mean = \_\_\_\_\_\_\_\_\_\_\_ |
| MAD = \_\_\_\_\_\_\_\_\_\_\_ | MAD = \_\_\_\_\_\_\_\_\_\_\_ |

Do your measures support your answers in parts (a) and (b)?

1. Fill in the answer blanks below or circle the appropriate choice.

|  |  |
| --- | --- |
| The average amount of calories in a beef hot dog is about \_\_\_\_\_\_\_\_than the average amount of calories in a poultry hot dog. |  (circle one)less greater |
| This difference in average calories per hot dog is approximately\_\_\_\_\_\_\_\_\_\_\_\_ (select an answer at right) of either type of hot dog. | (circle one)* About Half of the MAD
* Slightly less than 1 MAD
* Twice the MAD
 |

1. Again let’s assume that the two samples of hot dogs were selected randomly from all brands of hot dogs currently on the market. Do you think that beef hot dogs typically have more calories than poultry hot dogs? Explain your decision using information from the dot plots and from the answers to your questions in parts a – d.

**Teacher Notes**

Common Core Standards addressed by this activity:

Content Standards

|  |  |  |
| --- | --- | --- |
| Additional Focus | 7.SP.B.3 | Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable*. |
| Additional Focus | 7.SP.B.4 | Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book*. |

Primary Math Practices

MP 2 Reason abstractly and quantitatively.

MP 3 Construct viable arguments and critique the reasoning of others.

MP 4 Model with mathematics.

MP 6 Attend to precision.

**Acknowledgements**

The data for this activity is from the Data and Story Library: <http://lib.stat.cmu.edu/DASL/Datafiles/Hotdogs.html>

Reference: Moore, David S., and George P. McCabe (1989). *Introduction to the Practice of Statistics*. Original source: *Consumer Reports*, June 1986, pp. 366-367.

See also: *Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report - A Pre-K-12 Curriculum Framework*, p. 47