

## How many chips are in a chocolate chip cookie?

# 3

This edition of *Elementary Statistics* and previous editions have included data obtained from M&M plain candies. This Chapter Problem continues the legacy of using snack foods for statistical purposes, and the choice here is chocolate chip cookies as suggested by the article "Chocolate Chip Cookies as a Teaching Aid," by Herbert Lee (*The American Statistician*, Vol. 61, No. 4).

Table 3-1 lists the numbers of chocolate chips counted in different brands. The counts were obtained by the author, who found that the counting process was not as simple as it might seem. What do you do with loose chocolate chips that were found in each package? Some chocolate chips were stuck together, so they had to be counted with great care. Care also had to be taken to not count nut particles as chocolate chips. There were some small fragments that were not counted after the author made an arbitrary decision about the minimum size required to be counted as an official chocolate chip.

The counts in Table 3-1 do not include weights of the chocolate chips, and the Hannaford brand had many that were substantially larger than any of the chocolate chips in the other brands. Also, there is an issue with the sampling method. The author used all of the cookies in one package from each of the different brands. A better sampling method would involve randomly selecting cookies from different packages obtained throughout the country, and this would have required extensive travel by the author—a prospect with some appeal. In developing this Chapter Problem, the author learned much about chocolate chip cookies, including the observation that a huge pile of crushed chocolate chip cookies has absolutely none of the appeal of a single cookie untouched by human hands.

**Table 3-1** Numbers of Chocolate Chips in Different Brands of Cookies

### Chips Ahoy (regular)

22 22 26 24 23 27 25 20 24 26 25 25 19 24 20 22 24 25 25 20  
23 30 26 20 25 28 19 26 26 23 25 23 23 22 26 27 23 28 24

### Chips Ahoy (chewy)

21 20 16 17 16 17 20 22 14 20 19 17 20 21 21 18  
20 20 21 19 22 20 20 19 16 19 16 15 24 23 14 24

### Chips Ahoy (reduced fat)

13 24 18 16 21 20 14 20 18 12 24 23 28 18 18 19 22 21 22 16  
13 20 20 23 24 20 17 20 19 21 27 16 24 19 23 25 14 18 15 19

### Keebler

29 31 25 32 27 31 30 29 31 26 32 33 32 30 33 29 30  
28 32 35 37 31 24 30 30 34 29 27 24 38 37 32 26 30

### Hannaford

13 15 16 21 15 14 14 15 13 13 16 11  
14 12 13 12 14 12 16 17 14 16 14 15

- 3-1** Review and Preview
- 3-2** Measures of Center
- 3-3** Measures of Variation
- 3-4** Measures of Relative Standing and Boxplots