

## Chapter 4 Example

### Weight of pennies

The mint changed from copper to zinc in the early 1980s, did this affect the weights of pennies? Weights (in grams):

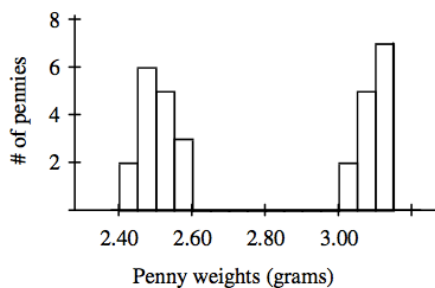
2.57 2.56 3.14 3.03 3.13 2.47 2.43 3.11      2.50 3.13 2.51 3.12 3.10 3.08 2.46 2.44  
3.06 2.48 2.51 2.50 3.07 3.08 3.01 2.45      2.47 2.54 3.09 3.13 2.56 2.49

### **Solution:**

#### **Think**

We are assuming that these pennies are a representative sample of all pennies minted. Create a histogram and a table of the summary statistics.

#### **Show**



Group	Light	Heavy
Count	16	14
Min	2.43	3.01
Max	2.57	3.14
Mean	2.496	3.091
SD	0.044	0.039
Median	2.495	3.095
Q1	2.465	3.07
Q3	2.525	3.13
IQR	0.06	0.06

#### **Tell**

The distribution of weights of pennies is bimodal. About half the pennies are in the lighter cluster, which is roughly symmetric with a median weight of 2.495g. Half of the lighter pennies weigh between 2.465g and 2.525g. The rest of the pennies are in the heavier cluster, which is slightly skewed to the left, with a median weight of 3.095g. Half of the heavier pennies weigh between 3.07g and 3.13g. Each group has an interquartile range of 0.06g. A little research tells us that the mint stopped using copper and started using zinc in the early 1980s. What we thought was one population of pennies was actually two: those minted before the switch, and those minted after the switch. (Note that we used the median and IQR to describe the lighter cluster, even though it had a symmetric distribution. That's because we were comparing it to the heavier cluster, in which we had to use the median and IQR, since the distribution was skewed.)