



Stem-and-Leaf Plots

In this activity, you will learn about a different graphical display for numeric data.

HABITS OF MIND

- Model with mathematics.
- Use appropriate tools strategically.

At the 2018 Winter Olympics, 92 countries competed in the events, but only 30 won medals. The 2016 Summer Olympics had 207 countries compete in the events. Athletes from 80 countries won medals, but only 44 countries won at least 5 medals.

The table located on page ⁶⁴⁶~~648~~ lists the total number of medals won by the top-performing countries in the 2016 Summer Olympics.

➤ Compare this data set to the data set for the total number of medals won at the 2018 Winter Olympics.

- 1 Do you think using a dot plot would be a good way to organize and analyze the data in the Summer Olympics table? **Explain your reasoning.**

A dot plot wouldn't be useful. The number line would need to go from 5 → 121

A numeric data display that can easily display data sets with a larger range of data values would be helpful to plot the 2016 Summer Olympic data.

A **stem-and-leaf plot** is a graphical method used to represent ordered numeric data.

➤ Create a stem-and-leaf plot displaying the number of medals won in the 2016 Summer Olympics.

WORKED EXAMPLE

STEP 1 Determine the **stems** and **leaves**. Typically, the stem is all the digits in a number except the rightmost digit, which is the leaf. For data that have only a ones place, the stem is 0.

STEP 2 Draw the stem-and-leaf plot. Place the stems in the left column and the leaves in numeric order in the right column. Title the display and include a key indicating what the stems and leaves represent.

**Total Medals Won by Countries
2016 Summer Olympics**

0	5 5 5 6 6 6 7 7 7 8 8 8 8 8 9 9
1	0 0 0 1 1 1 1 1 3 3 5 5 7 8 8 8 9 9
2	2 8 9
3	
4	1 2 2
5	6
6	7
7	0
8	
9	
10	
11	
12	1

Key: 4 | 1 = 41 medals won.



➤ Analyze the stem-and-leaf plot in the worked example.

2 What does 7 | 0 mean in the stem-and-leaf plot?

one country won 70 medals

3 What does 0 | 5 mean?

A country won 5 medals

4 How many stems are in the stem-and-leaf plot?

13 stems

5 How many leaves are in the stem-and-leaf plot? Why are there that many leaves?

44 leaves

one for each country

6 Why would a stem have more than one leaf?

if more than one country won a certain number of medals in a increment of 10 (ex: 20's, 30's, 40's...)

Total Medals Won by Countries
2016 Summer Olympics

0	5 5 5 6 6 6 7 7 7 8 8 8 8 8 9 9
1	0 0 0 1 1 1 1 1 3 3 5 5 7 8 8 8 9 9
2	2 8 9
3	
4	1 2 2
5	6
6	7
7	0
8	
9	
10	
11	
12	1

Key: 4 | 1 = 41 medals won.



7 Why do some stems have no leaves?

No country won that increment of 10 medals

8 Why do some stems have the same leaf repeated?

Multiple countries won the same number of medals.

9 Carlos claims that he should write 0s as leaves after the stems 3, 8, 9, 10, and 11 to show that there are no countries that have an amount of medals in the 30s, 80s, 90s, 100s, or 110s. Is Carlos correct? **Explain your reasoning.**

Carlos is incorrect.

If he wrote zeros then it would mean that a country won that number of medals (ex: 30 medals)

10 What is the most common number of medals won? How can you determine this from the stem-and-leaf plot?

8 & 11 ; these are the most repeated leaves in one row.

11 Describe the distribution and any interesting patterns you notice in the stem-and-leaf plot. Interpret your findings in terms of the number of medals won in the 2016 Summer Olympics.

The data is skewed right.
 There is a gap from the 80's → 110's.
 Most countries won very few medals.
 One country won a lot of medals (121) and this is an outlier

TAKE NOTE...

To see the distribution better, rotate the stem-and-leaf plot so that the stems resemble a horizontal number line.