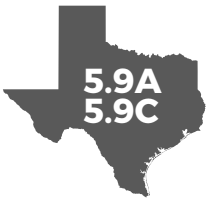
USING STEM-AND-LEAF PLOTS



The student is expected to represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots.

The student is expected to solve one- and two-step problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot.

TELL ME MORE...

A **stem-and-leaf plot** is a graphical display used to organize numerical data. First the data are arranged in numerical order, and then they are organized in the plot according to place value.

The **stem** represents a common set of place values. The **leaves** last digit of each number.

The stem is the digit (or digits) to the left of the last place value.

Stem	Leaf
0	8 8 9
1	1 2 2 4 6 7 7
2	1 1 3 8
3	0 5

Key 5 | 1 = 51

The leaves are the digits in the last or rightmost place value.

The key indicates the place value for the numbers in the stem and leaf columns. A key of 5|1 = 51 shows that the stem values represent the tens place and the leaf values represent the ones place.

In the example data set, there are 16 values. The key indicates that the leaf values represent the ones place and the stem values represent the tens place. The data values in the set are: 8, 8, 9, 11, 12, 12, 14, 16, 17, 17, 21, 21, 23, 28, 30, and 35. When a leaf appears more than once, the number appears in the data set with the same frequency.

Decimal or fractional values can also be placed in a stem-and-leaf plot. For example, in a plot with a key of 5 | 1 = 5.1, the stem values represents the ones place of each number and the leaves represent the tenths place of each number.

MAKE A NOTE . . .

How would the stem-and-leaf plot key appear when the numbers in the data set are 3-digit numbers such as 456?

EXAMPLES

EXAMPLE 1: The list below shows the number of points scored by each player on the baseball team during the season. Use a stem-and-leaf plot to represent the data.

19, 15, 40, 41, 22, 10, 37, 26, 41, 37, 12, 5, 41, 39, 16

STEP 1 Arrange the data in numerical order from least to greatest.

5, 10, 12, 15, 16, 19, 22, 26, 37, 37, 39, 40, 41, 41, 41

STEP 2 Determine the stems and the leaves for the plot.

- The data set contains the range of numbers from 5 to 41.
- The stems contain the digits to the left of the ones place, which in this set are the tens places from 0 to 4.

The stems are the tens place digits from each data value.
The leaves are the ones place digits from each data value.

STEP 3 Create the plot by completing the stem and leaf columns with the data set values.

- Note that the number 37 appears twice in the data set. This means the value 7 appears twice in the leaf for a stem of 3.
- The number 41 appears three times in the data set. The digit 1 will appear three times for the stem of 4.

Stem	Leaf
0	5
1	0 2 5 6 9
2	2 6
3	7 7 9
4	0 1 1 1

Key 2 | 1 = 21

EXAMPLE 2: The stem-and-leaf plot shows the scores of ice skaters at a qualifying competition. The score to qualify for the next level of the competition is 8.5 or higher. How many skaters qualify for the next level of the competition? Record your answer and fill in the bubbles. Be sure to use the correct place value.

Stem	Leaf
5	1 2 5 6 6 7
6	7
7	3 5
8	0 1 2 4 5 7
9	0 3 5

Key 2 | 1 = 2.1

STEP 1 Interpret the key for the plot to determine the data values represented by the plot.

The key 2|1 = 2.1 means that the stems represent the ones place and the leaves represent the tenths place of each data value.

STEP 2 Find the value in the table representing 8.5.

The score 8.5 is represented by the digit 5 in the leaf column for the stem of 8.

STEP 3 Count the values in the stem-and-leaf plot that are 8.5 or higher.

- There are 5 values of 8.5 or higher in the plot including the numbers 8.5, 8.7, 9.0, 9.3, and 9.5.

5 skaters qualify for the next level of the skating competition.

Stem	Leaf
5	1 2 5 6 6 7
6	7
7	3 5
8	0 1 2 4 **5** 7
9	0 3 5

Key 2 | 1 = 2.1

YOU TRY IT!

The stem-and-leaf plot represents a set the individual sales data for a local scout troop selling cookies. What is the difference between the greatest number of cookies sold and the least number of cookies sold?

- What was the largest quantity of cookie boxes sold by a scout?
- What was the least quantity of cookie boxes sold by a scout?
- _____ – _____ = _____

Answer: _____

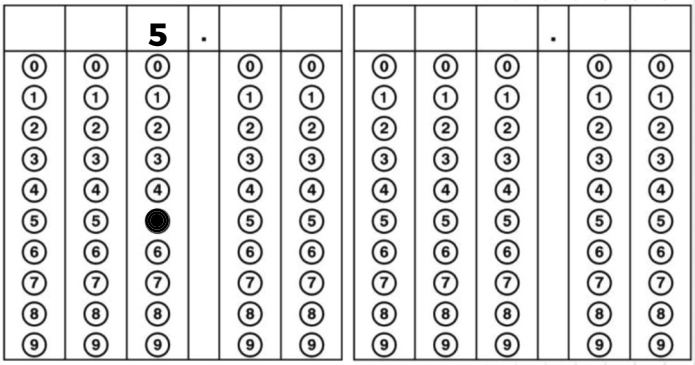
Cookie Boxes Sold

Stem	Leaf
22	1 5 8
23	7
24	3 4 5 7
25	0 1 2 4 5
26	2 2 2 8
27	6
28	0 1 3 3 6
30	9

Key 21 | 1 = 211

STEP 4 Since the question is a gridded response question, enter your response on the grid provided. Practice using the grid with the instructions.

1. Record a 5 in the ones column.
2. Bubble **5** beneath the numeral 5.



PRACTICE

1. The set of data shows the size of several animal parks in the United States in acres.

58, 85, 95, 80, 55, 80, 64, 90, 75, 92

Represent the data using a stem-and-leaf plot. Be sure to include a key for the plot.

Animal Park Size (acres)

Stem	Leaf

Key | =

2. When making a stem and leaf plot to organize a set of numbers such as 25.1, 26.3, 28.4, 24.4, 23.6, 25.4, and so on, how should the key appear?

3. The stem-and-leaf plot represents a runner's time data, in seconds, while training for a track event.

Runner Time (seconds)

Stem	Leaf
10	6
11	
12	4 8 9
13	0 3 6
14	1 1 8

Key 15 | 2 = 15.2

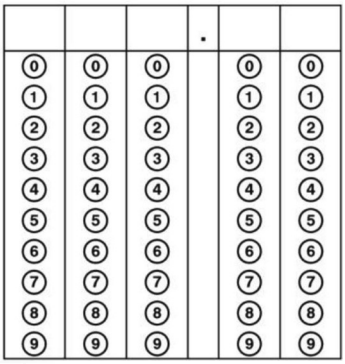
How many times did the runner finish the distance with a time faster than 13 seconds?

4. The stem-and-leaf plot shows the heights in centimeters of the students in Mr. Martin's homeroom. What is the difference between the highest and lowest value in the data set? Record your answer and fill in the bubbles. Be sure to use the correct place value.

Student Heights (cm)

Stem	Leaf
11	0 0 0 8
12	2 4 7
13	5
14	4 4 9
15	2
16	0 5 7 7

Key 21 | 4 = 214



5. The stem-and-leaf plot shows the grams of net carbohydrates found in the food items Nancy ate today. What fraction of the food items Nancy ate have more than 10 grams of net carbohydrates?

Carbohydrate Amount (grams)

Stem	Leaf
0	2 2 4 5 5 7
1	0 3 4 4 8
2	6 7
3	9

Key 1 | 2 = 12

6. Miguel picked up a small jar of screws in the garage and started to sort them by length in inches. The stem-and-leaf plot shows the lengths of all the screws in the jar.

Length of Screws (in.)

Stem	Leaf
0	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{4}$ $\frac{7}{8}$
1	$\frac{1}{4}$ $\frac{5}{8}$
2	$\frac{3}{8}$ $\frac{1}{2}$ $\frac{3}{4}$

Key 1 | $\frac{1}{2}$ = 1 $\frac{1}{2}$

If Miguel lined all the screws from end to end, what would be the total length?

7. The stem-and-leaf plot shows the daily high temperature values for a 3-week period.

High Temperatures (˚F)

Stem	Leaf
2	2 8
3	5 9
4	0 2 3 5 6 6 7 9 9 9
5	0 1 1 1 4
6	
7	3 6

Key 2 | 4 = 24

How many more days was the temperature above 45° than it was 45° or below?

A 2

B 8

C 5

D 13

8. Researchers weighed student backpacks. The weights of some of the backpacks are listed below. Weights are listed in pounds.

9.3, 8.1, 10, 11.3, 10.2, 8.2, 11.5, 10.9, 8.7, 10.8, 8.8, 12.4, 9.3, 9.7, 11, 9.9, 10, 10.2, 11.6

Which stem-and-leaf plot best represents the data?

F

Backpack Weight (lb)

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

Key 15 | 4 = 15.4

H

Backpack Weight (lb)

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

Key 15 | 4 = 15.4

G

Backpack Weight (lb)

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

Key 15 | 4 = 15.4

J

Backpack Weight (lb)

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

Key 15 | 4 = 15.4