Vocabulary:

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

Key: 2|0 = 20

Stem-and-Leaf: Uses the digits of data values to organize a data set. It shows how data are distributed.

Stem: digit or digits on the left

digit or digits on the right

The *key* explains what the stems and leaves represent.

Example 1: Make a stem-and-leaf plot of the length of the 12 cell phone calls.

a.) Order the data:

2, 3, 5, 6, 10, 14, 18, 23, 23, 30, 36, 55

b.) Write the stems on the left of the vertical line

c.) Write the leaves for each stem to the right of the vertical line.

	A	B
1	DATE	MINUTES
2	JULY 9	55
3	JULY 9	3
4	JULY 9	6
5	JULY 10	14
6	JULY 10	18
7	JULY 10	5
8	JULY 10	23
9	JULY 11	30
10	JULY 11	23
11	JULY 11	10
12	JULY 11	2
13	JULY 11	36

Cell Phone Call Lengths

Order the stems vertically. The stem for data values less than 10 is 0.

Write the leaves horizontally.

Include stems without leaves.

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

Key: 1|4 = 14 minutes

Example 2: The stem-and-leaf plot shows student scores.

a.) How many students scored less than 80 points?

5 students scored less than 80

b.) How many students scored at least 90 points?

4 students scored at least 90

c.) How are the data distributed?

Most of the scores are in the middle.

Test Scores

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

Key: 9|2 = 92 points

Example 3: Which statement is not true?

a.) Most of the plants are less than 20 inches tall.

b.) **The median plant height is 11 inches.**

c.) The range of the plant heights is 35 inches.

d.) The plant height that occurs most often is 11 inches.

Plant Heights

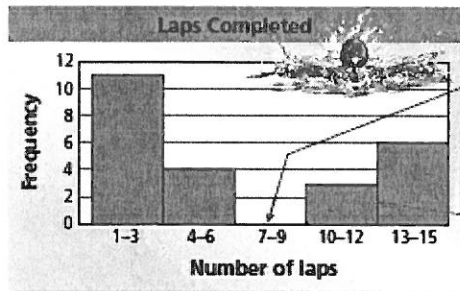| Stem	Leaf
0	1 2 4 5 6 8 9
1	0 1 1 5 7
2	2 5
3	6

Key: 1|5 = 15 inches

10.2 Histogram Teacher Notes

Vocabulary:

Histogram: A bar graph that shows the frequency of data values in intervals of the same size.

Example 1: The frequency table shows the numbers of laps that people in a swimming class completed today. Display the data in a histogram.

Number of Laps	Frequency
1–3	11
4–6	4
7–9	0
10–12	3
13–15	6

Laps Completed

Include any interval with a frequency of 0. The bar height is 0.

There is no space between the bars of a histogram.

Example 2: The histogram shows the winning speeds at the Daytona 500.

a.) Which interval contains the most data values?

   The 150-159 miles per hour interval contains the most data values because it is the tallest.
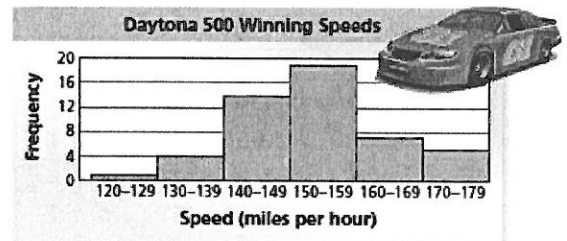
b.) How many of the winning speeds are less than 140 miles per hour?
   1 + 4 = 5 winning speeds are less than 140 miles per hour.

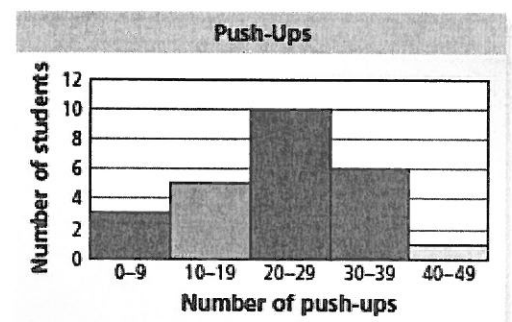c.) How many of the winnings speeds are at least 160 miles per hour?
   7 + 5 = 12 winning speeds are at least 160 miles per hour.

Example 3: Which statement cannot be made using the data display?

   a.) Most students can do between 20-29 push-ups.

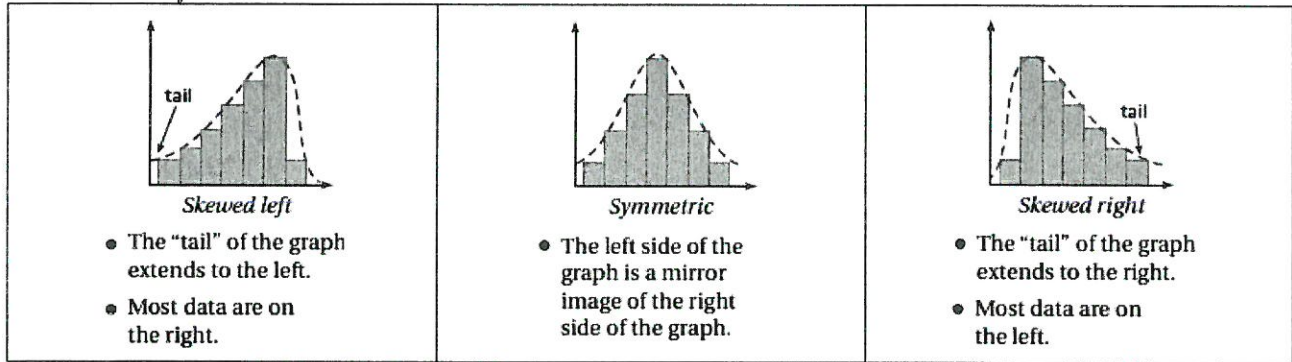   b.) Five students completed at least 10 and at most 19 push-ups.

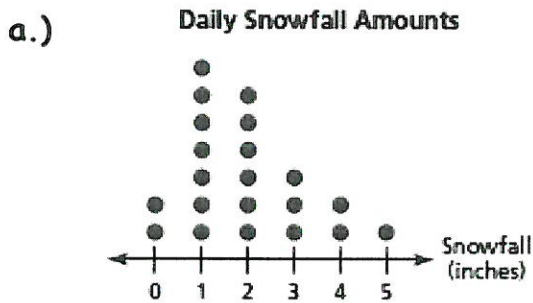   c.) At least one student completed more than 39 push-ups.

   d.) 15 students completed at least 20 and at most 39 push-ups.

Vocabulary:

Skewed left	Symmetric	Skewed right
• The "tail" of the graph extends to the left. • Most data are on the right.	• The left side of the graph is a mirror image of the right side of the graph.	• The "tail" of the graph extends to the right. • Most data are on the left.

Example 1: Describe the shape of each distribution.

a.)

Daily Snowfall Amounts

Most of the data is on the left, and the tail extends right.
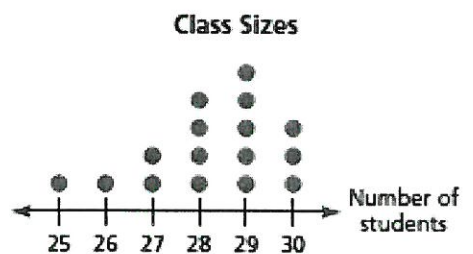**Skewed Right**

b.)

Passes Thrown
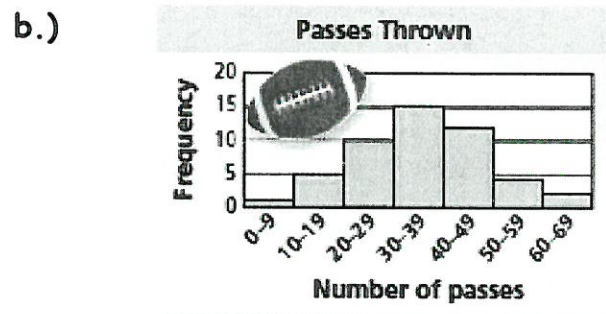
Left side of the graph is approximately a mirror of the right side.
Symmetric

Example 2:
a.) Make a dot plot of the following class size information:

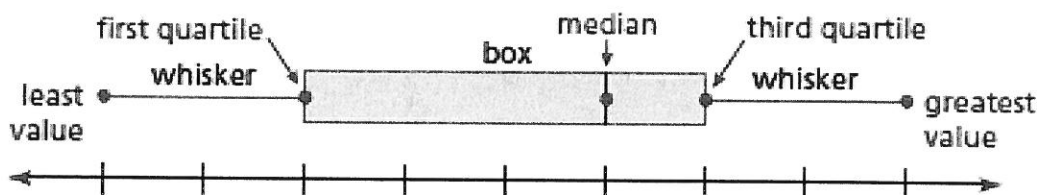| 26	29	27	29	28	29	30	28
28	30	30	25	29	27	28	29

b.) Describe the shape of the distribution.
Most of the data is on the right and the tail is on the left. It is skewed left.

Class Sizes

10.4 Box-and-Whisker Plots

Vocabulary:

Box-and-Whisker Plots: Represents a data set along a number line by using the least value, greatest value, and the quartiles of the data.
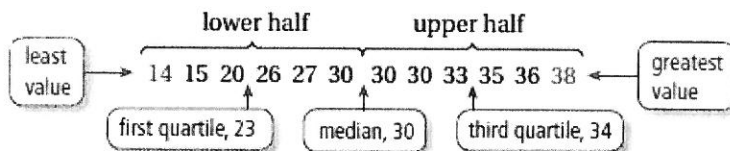

EXAMPLE 1 — Making a Box-and-Whisker Plot

Make a box-and-whisker plot for the ages (in years) of the spider monkeys at a zoo:

$$15, 20, 14, 38, 30, 36, 30, 30, 27, 26, 33, 35$$

Step 1: Order the data. Find the median and the quartiles.

lower half   upper half

least value → 14 15 20 26 27 30 , 30 30 33 35 36 38 ← greatest value

first quartile, 23   median, 30   third quartile, 34

Step 2: Draw a number line that includes the least and greatest values. Graph points above the number line that represent the five-number summary.

Step 3: Draw a box using the quartiles. Draw a line through the median. Draw whiskers from the box to the least and the greatest values.

Age (years)

14 16 18 20 22 24 26 28 30 32 34 36 38
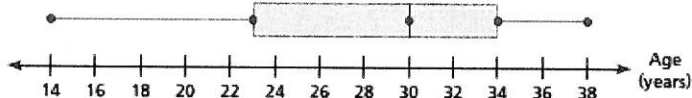
EXAMPLE 2 — Analyzing a Box-and-Whisker Plot

The box-and-whisker plot shows the body mass index (BMI) of a sixth grade class.

BMI

17 18 19 20 21 22 23 24 25 26 27 28
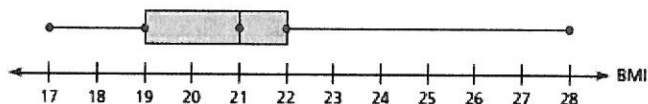
a. **What fraction of the students have a BMI of at least 22?**

   The right whisker represents students who have a BMI of at least 22.

   ∴ So, about $\frac{1}{4}$ of the students have a BMI of at least 22.

b. **Are the data more spread out below the first quartile or above the third quartile? Explain.**

   The right whisker is longer than the left whisker.

   ∴ So, the data are more spread out above the third quartile than below the first quartile.

c. **Find and interpret the interquartile range of the data.**

   interquartile range = third quartile − first quartile

   $$= 22 - 19 = 3$$

   ∴ So, the middle half of the students' BMIs varies by no more than 3.