

### Content and Language Objectives

Students will create and interpret histograms and explain in what situation it is appropriate to use the histogram after:

- a.) exploring the characteristics of histograms
- b.) discussing with a partner the differences between histograms and bar graphs

### Warm-Up

### Content and Language Objectives

Students will create and interpret histograms and explain in what situation it is appropriate to use the histogram after:

a.) exploring the characteristics of histograms

b.) discussing with a partner the differences between histograms and bar graphs

#### **The Histogram**

The **histogram** is a summary graph showing a count of the data points falling in various ranges. The effect is a rough approximation of the frequency distribution of the data.

The groups of data are called *classes*, and in the context of a histogram they are known as *bins*, because one can think of them as containers that accumulate data and "fill up" at a rate equal to the frequency of that data class.

Consider the exam scores of a group of students. By defining data classes each spanning an interval of 10 points and counting the number of scores in each data class, a frequency table can be constructed as in the following example:

#### **Frequency Table**

Group	Count
0 - 9	1
10 - 19	2
20 - 29	3
30 - 39	4
40 - 49	5
50 - 59	4
60 - 69	3
70 - 79	2
80 - 89	2
90 - 99	1

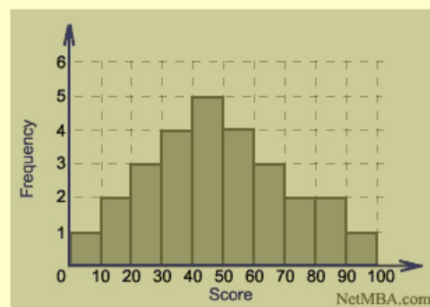
### Content and Language Objectives

Students will create and interpret histograms and explain in what situation it is appropriate to use the histogram after:

- a.) exploring the characteristics of histograms
- b.) discussing with a partner the differences between histograms and bar graphs

To construct the histogram, groups are plotted on the  $x$  axis and their frequencies on the  $y$  axis. The following is a histogram of the data in the above frequency table.

**Histogram**



### Content and Language Objectives

Students will create and interpret histograms and explain in what situation it is appropriate to use the histogram after:

- a.) exploring the characteristics of histograms
  - b.) discussing with a partner the differences between histograms and bar graphs
- 

Histograms are useful data summaries that tell us important info about our data:

- The general shape of the frequency distribution
- Symmetry of the distribution and whether it is skewed

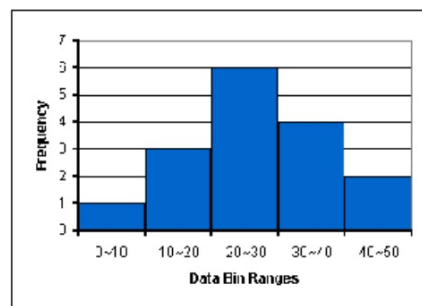
The shape of the histogram is sometimes sensitive to the number of bins.

- If the bins are too wide, important information can be missing because it doesn't show the distribution nicely, it clumps it together
- If the bins are too narrow, the information is being broken down too narrowly which also doesn't show the distribution nicely because it spreads it out too much

To determine the bin width, it is important to look at the data values and determine how wide the width should be in order to get between 5 and 20 bins of data

The histogram provides a graphical summary of the shape of the data's distribution.

## Example of a histogram



Data Range	Frequency
0-10	1
10-20	3
20-30	6
30-40	4
40-50	2

Note that the median is 25 and that there is no mode; the mean is 26.5.

**Bar graph with NO spaces/gaps and  
NO overlapping  
Data for graph comes from a frequency table.**

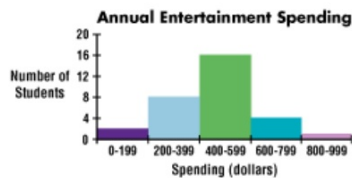
### Content and Language Objectives

Students will create and interpret histograms and explain in what situation it is appropriate to use the histogram after:

- a.) exploring the characteristics of histograms
- b.) discussing with a partner the differences between histograms and bar graphs

**Try these..... move the black box to see answer.**

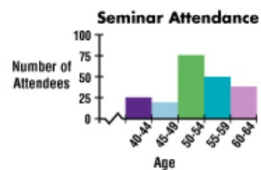
How large is each interval in the histogram below?



- ☐ A. 1,000
- ☐ B. 500
- ☐ C. 100
- ☐ D. 200



From the histogram below, which age interval had the most attendees?



- ☐ A. 60-64
- ☐ B. 55-59
- ☐ C. 50-54
- ☐ D. 45-49



**Content and Language Objectives**

Students will create and interpret histograms and explain in what situation it is appropriate to use the histogram after:

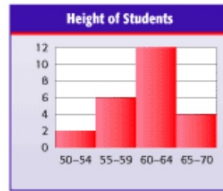
a.) exploring the characteristics of histograms

b.) discussing with a partner the differences between histograms and bar graphs

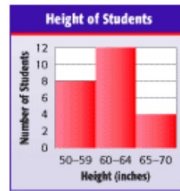
The frequency table shows the heights of the students in Ms. Ortega's second period class. Which histogram correctly and completely shows the data?

Height of Students		
Height (inches)	Tally	Frequency
50-54		2
55-59		6
60-64		12
65-70		4

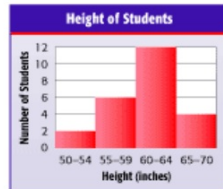
A.



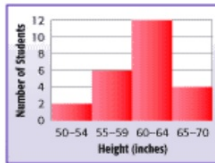
B.



C.



D.



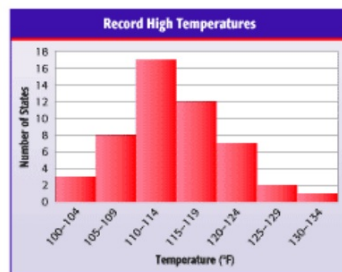
### Content and Language Objectives

Students will create and interpret histograms and explain in what situation it is appropriate to use the histogram after:

a.) exploring the characteristics of histograms

b.) discussing with a partner the differences between histograms and bar graphs

The histogram shows the record high temperatures for the fifty states. How many states have a record high temperature no less than  $120^{\circ}\text{F}$ ?



Source: National Climatic Data Center

- ☐ A. 10 states
- ☐ B. 22 states
- ☐ C. 3 states
- ☐ D. 7 states

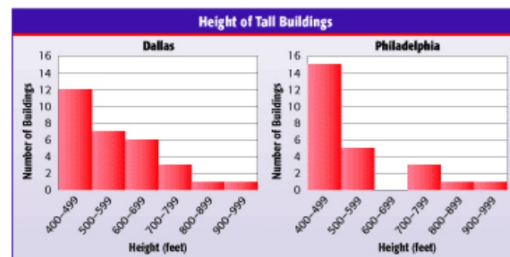
### Content and Language Objectives

Students will create and interpret histograms and explain in what situation it is appropriate to use the histogram after:

a.) exploring the characteristics of histograms

b.) discussing with a partner the differences between histograms and bar graphs

The histograms show the number of buildings above 400 feet in Dallas and Philadelphia. Which statement is true?



Source: The World Almanac

- ☐ Philadelphia has more buildings 700 feet or taller than Dallas
- A. has.
- ☐ Dallas has more buildings between 400 and 599 feet than Philadelphia has.
- B. Philadelphia has.
- ☐ Dallas has more buildings 600 feet or taller than Philadelphia
- C. has.
- ☐ Philadelphia has more buildings 400 feet and taller than Dallas
- D. has.

