GRAPHS

"A picture is worth a thousand words." *Barnard* (1927)

Graphs Are Used To:

1.

2.

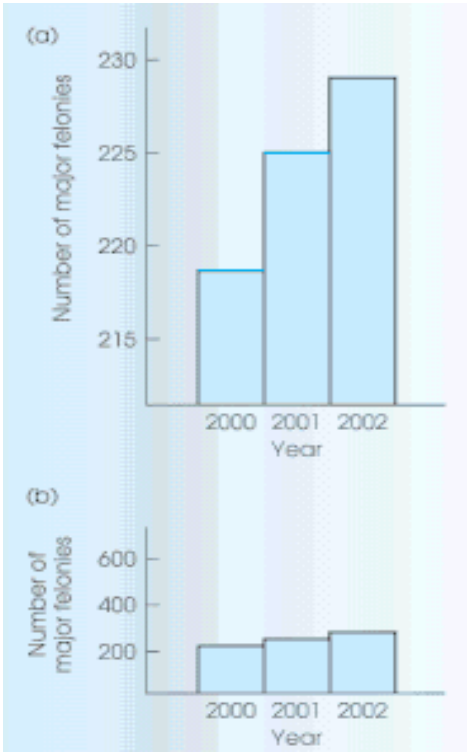
3.

But Graphs Can Distort

Example

Two graphs showing the number of major felonies in a city over a 3-year period. Both graphs show exactly the same data.

Year	Number of major felonies
2000	218
2001	225
2002	229



Basic Terminology for Graphs

Axes:

***X*-axis (the abscissa)**
- The horizontal line of a graph
- In freq distribution graph, the DV (scores) is represented the X-axis
- In a graph depicting the results of an experiment, the IV is represented on the X-axis

***Y*-axis (the ordinate)**
- The vertical line of a graph
- In a frequency distribution graph, the frequency is represented on the Y-axis
- In a graph depicting the results of an experiment, the DV is represented on the Y-axis

General Rules for Constructing Graphs

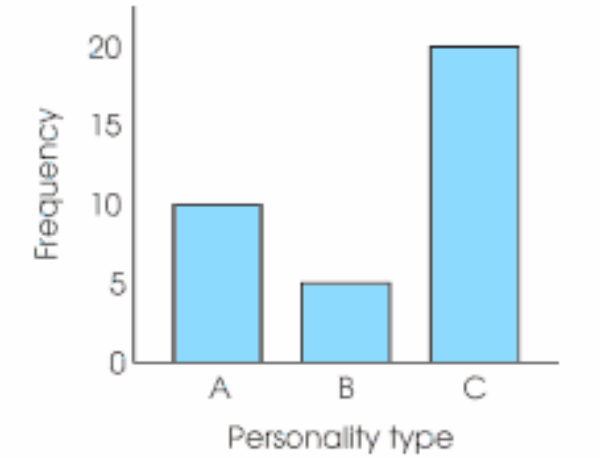
- Give the graph a clear, unambiguous title or figure caption
- Assign appropriate labels and meaningful numbers to each axis
- Values on the X-axis increase from left to right
- Values on the Y axis increase from bottom to top
- The pt where the 2 axes intersect should have a value of (0, 0)
- When plotting data from a frequency distribution, plot the DV (score) along the abscissa and the frequency along the ordinate
- When plotting experimental relationships, plot the IV along the abscissa and the DV along the ordinate
- The graph should be constructed so that its height (Y-axis) is approximately $2/3^{rd}$ to $3/4^{th}$ of its length
- Violating these rules produces graphs that give a misleading picture of the data

GRAPHS FOR NOMINAL OR ORDINAL DATA

Bar graphs

How to draw:

Example:



A bar graph showing the distribution of personality types in a sample of college students. Because personality type is a discrete variable measured on a nominal scale, the graph is drawn with space between the bars.

Class Example:

Plot class members' eye color (brown, blue, green, other) on the X-axis and frequency on the Y-axis

GRAPHS FOR INTERVAL OR RATIO DATA

1) Histograms

2) Polygons

Class Example:

We will use the data in the table below to:

1. sketch a frequency distribution histogram
2. sketch a frequency distribution polygon
3. sketch a cumulative frequency distribution polygon
4. sketch a relative frequency distribution polygon
5. sketch a cumulative relative frequency polygon
6. sketch a cumulative percent polygon

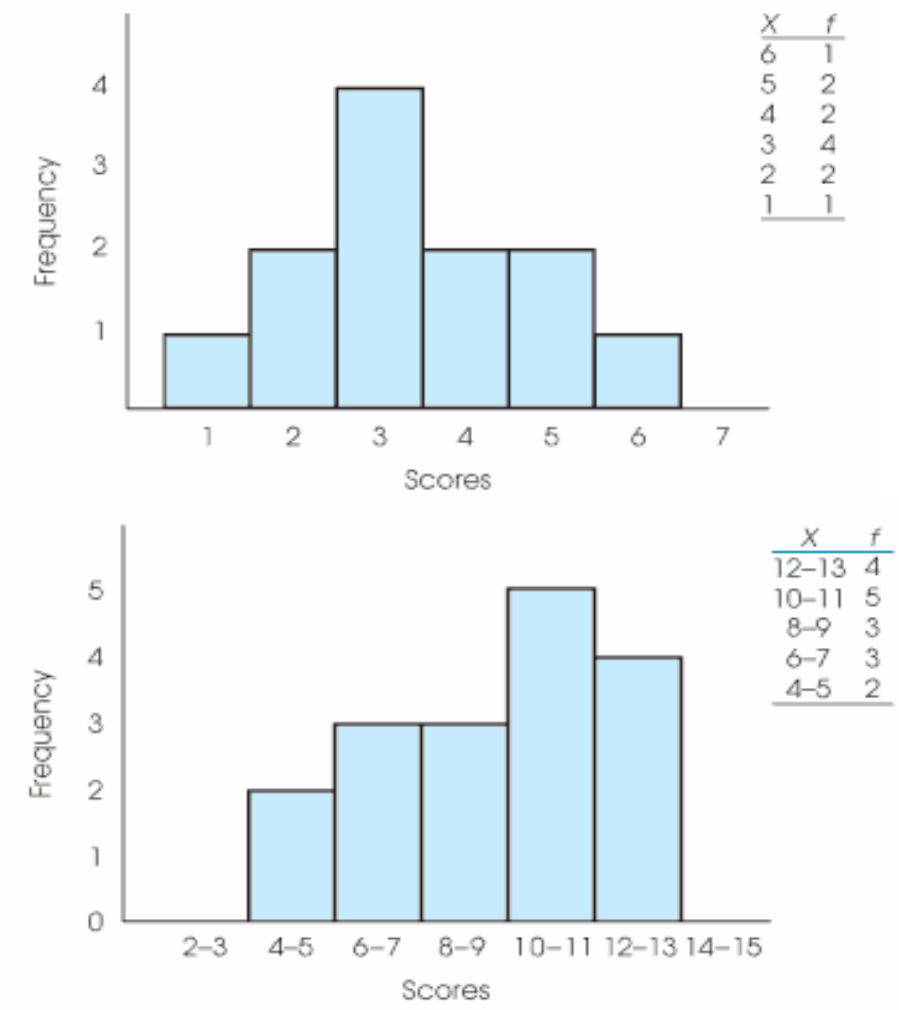
X	***f***	***cum f***	***relative f (p)***	***cum relative freq (p)***	***cum percent (%)***
6	1				
5	2				
4	2				
3	4				
2	2				
1	1				

Frequency histogram

What it is:

What it's used for:

How to draw:

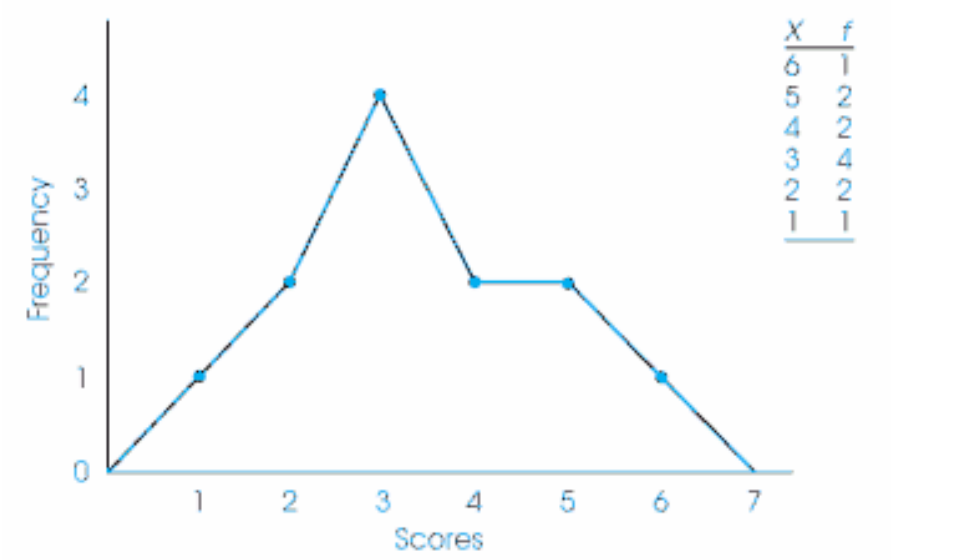


Frequency polygon

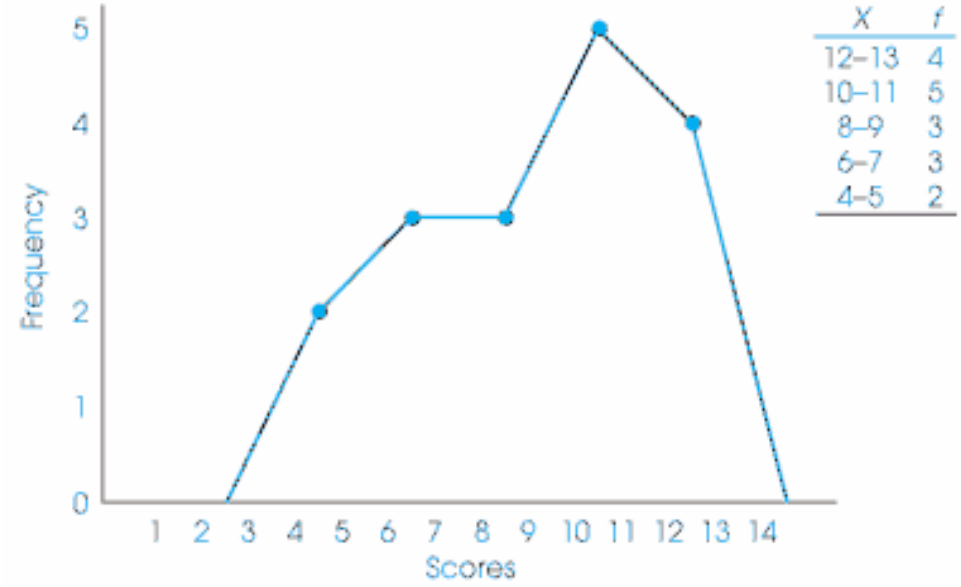
What it is:

What it is used for:

How to draw it:



X	f
6	1
5	2
4	2
3	4
2	2
1	1



X	f
12–13	4
10–11	5
8–9	3
6–7	3
4–5	2

Cumulative frequency polygon

Cumulative frequency:

How to draw:

Relative frequency polygon (proportions)

Relative frequencies:

Purpose:

How to draw:

Cumulative relative frequency polygon (proportions)

Cumulative relative frequency:

How to draw:

Cumulative percent polygon (percentiles)

Cumulative %:

How to draw:

Benefit:

LEARNING CHECK

Directions: using class height data, enter classmates' heights into the table below and then sketch the following graphs:

1. a frequency distribution histogram
2. a frequency distribution polygon
3. a cumulative frequency distribution polygon
4. a relative frequency distribution polygon
5. a cumulative relative frequency polygon
6. a cumulative percent polygon

X	***f***	***cum f***	***relative f (p)***	***cum relative freq (p)***	***cum percent (%)***
76 (6'4")					
75 (6'3")					
74 (6'2")					
73 (6'1")					
72 (6'0")					
70 (5'10")					
69 (5'9")					
68 (5'8")					
67 (5'7")					
66 (5'6")					
65 (5'5")					
64 (5'4")					
63 (5'3")					
62 (5'2")					
61 (5'1")					
60 (5'0")					

Stem-And-Leaf Diagram

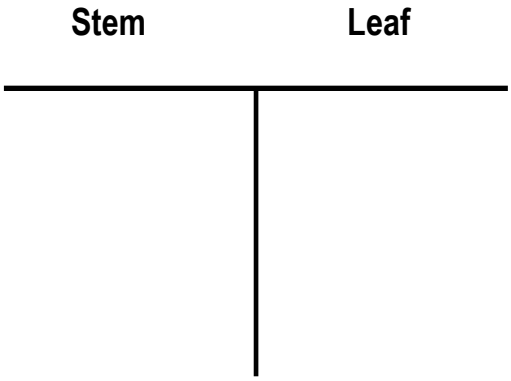
What it is:

- The leaf
- The stem

How to draw:

Example:

Raw data
34
38
45
56
67
81



Another purpose: allows for comparison between groups

Example:
The pulse rates of 30 high school students prior to jogging a mile in PE class:

Females:
75 68 77 72 102
78 83 75 81 95
73 80 65 74 75

Males:
69 90 70 97 83
77 68 90 72 110
98 105 95 85 87

Females	Stems	Males

Conclusion?

<u>Stem-and-leaf class activity</u>

- Count the change in your pockets and/or purses
- Record your data on the board
- Prepare a regular stem-and-leaf diagram
- Prepare a back-to-back stem-and-leaf diagram, separating the class data by gender