

More Data Types ← not important

Differences between measurements, true zero exists

Ratio Data

← eg any data such as income, weight, ...
Quantitative Data

Differences between measurements but no true zero

Interval Data

← eg credit score ✓

Ordered Categories (rankings, order, or scaling)

Ordinal Data

← eg shoe size

Categories (no ordering or direction)

Nominal Data

Qualitative Data

← eg eye color

eg Sixty adults with gum disease were asked the number of times per week they used to floss before their diagnosis. The (incomplete) results are shown in [Table 1.35](#).

# Flossing per Week	Frequency	Relative Frequency	Cumulative Relative Freq.
0	27	0.4500	0.4500
1	18	0.3000	0.7500
3	11	0.1833	0.9333
6	3	0.0500	0.9833
7	1	0.0167	1.0000

Table 1.35 Flossing Frequency for Adults with Gum Disease

- Fill in the blanks in [Table 1.35](#). ✓
- What percent of adults flossed six times per week?
- What percent flossed at most three times per week?

$$S: b. 0.05 \cdot 100\% = \boxed{5\%}$$

$$c. 0\checkmark, 1\checkmark, 3\checkmark$$

$$0.4500 + 0.3000 + 0.1833$$

$$0.4500 + 0.3000 + 0.1833$$

$$= \boxed{0.9333}$$

IV. Histogram ← for frequency distribution only

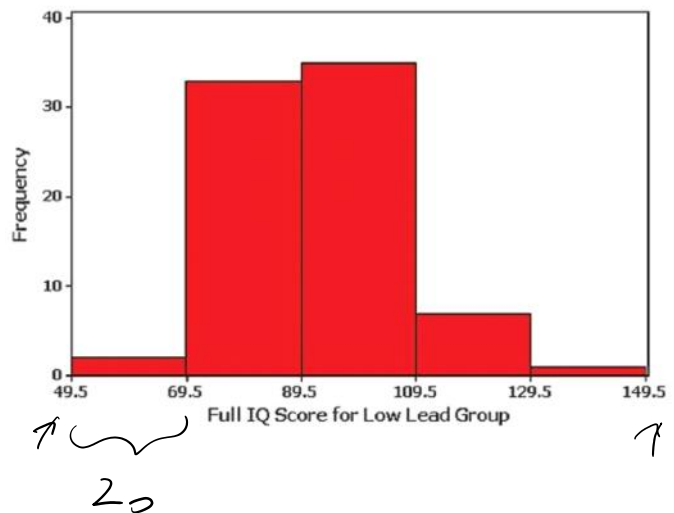
A histogram is a display of a frequency distribution.

Frequency distribution

IQ Score	Frequency
50-69	2
70-89	33
90-109	35
110-129	7
130-149	1

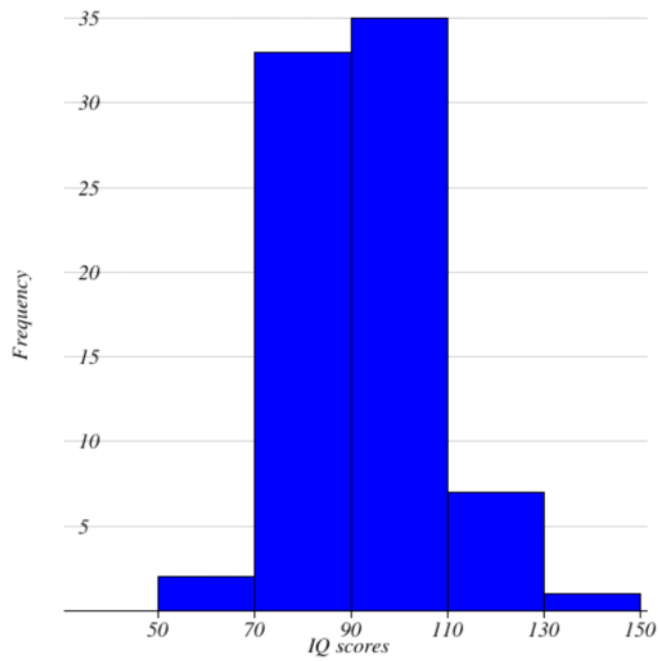


Histogram



However, we use technology to graph.

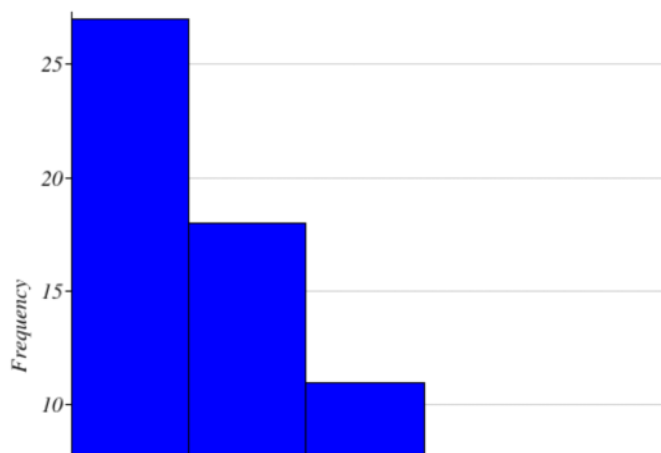
<http://www.imathas.com/stattools/histo.html>



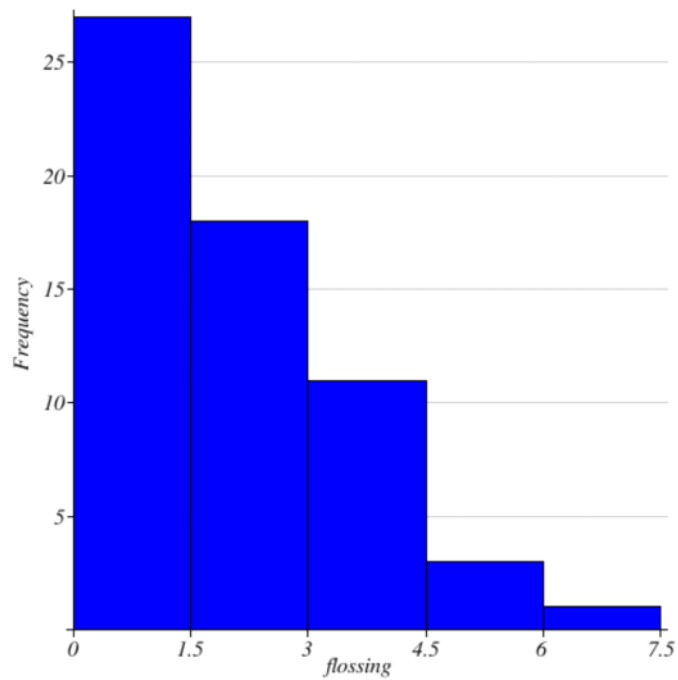
Eg Plot a histogram for the following distribution:

# Flossing per Week	Frequency
0	27
1	18
3	11
6	3
7	1

Sc:



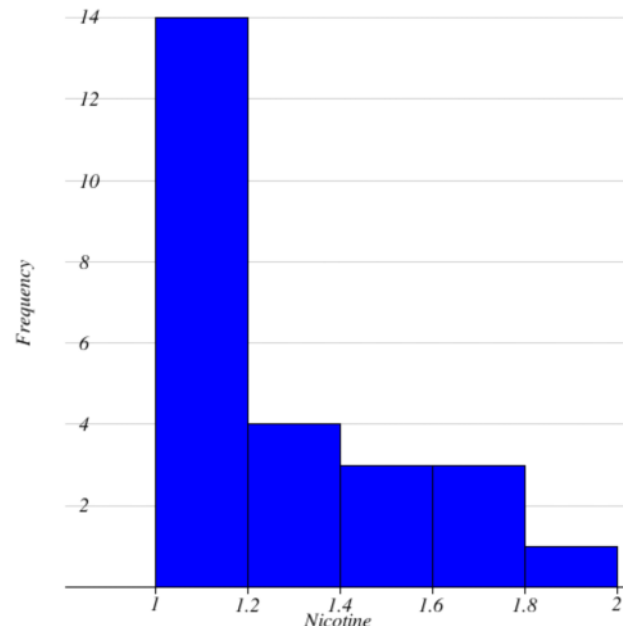
S :

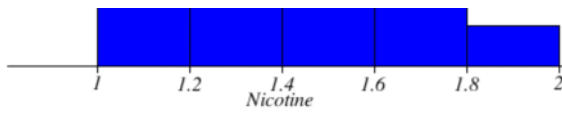


Eg Plot a histogram for the following distribution:

Amount of nicotine	Frequency
1.0 – 1.1	14
1.2 – 1.3	4
1.4 – 1.5	3
1.6 – 1.7	3
1.8 – 1.9	1

S :





* Stem - leaf ← not important

eg

For Professor Dean's spring pre-calculus class, scores for the first exam were as follows (smallest to largest): → → → → is an ascending order
33; 42; 49; 49; 53; 55; 55; 61; 63; 67; 68; 68; 69; 69; 72; 73; 74; 78; 80; 83; 88; 88; 88; 90; 92; 94; 94; 94; 94; 96; 100

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

Table 2.1 Stem-and-Leaf Graph

Eg Build a stem-leaf graph for the following data:

10, 12, 15, 17, 20, 25, 30, 35, 40, 42, 42, 45, 50, 55, 65, 65, 67, 80, 82, 85, 90, 92, 98, 99, 99

S:

10's stem	1's leaf
1	0 2 5 7
2	0 5
3	0 5
4	

2	0 3
3	0 5
4	0 2 2 5
5	0 5
6	5 5 7
7	
8	0 2 5
9	0 2 8 9 9

V. Measure of Position

i. Percentile $\leftarrow$ rank in a 100

Defn: It measures the position from 0 to 100. (Exactly 0 to 99)

The notation for #'s percentile is $P_{\#}$.

eg P_5 is the 5th percentile.

eg P_{99} is the 99th percentile.

eg P_{83} is the 83rd percentile.

$$\text{Percentile of data } x = \frac{\text{num of value less than } x}{\text{total num of values}} \cdot 100\%$$

$$\frac{n < x}{\text{total}} \cdot 100\%$$

$\leftarrow$ eg You score 93 in a test, how well you stand for the class?

... now will you stand for the class?

S: Find the percentile

eg Given 2, 8, 15, 18, 19, 20. Find percentile of 15.

S: Sort ✓

$$P_{15} = \frac{2}{6} \cdot 100\%$$

← 2, 8 is less than 15
2 of them

← total number of data values

$$\approx 33\%$$

← not done

$$= \boxed{33^{\text{rd}}} \text{ or } \boxed{33}$$

← it's okay

eg Given 2, 8, 15, 18, 19, 20. Find percentile of 19.

$$S: P_{19} = \frac{4}{6} \cdot 100\%$$

← 2, 8, 15, 18
4 of them

$$\approx 0.67 \cdot 100\%$$

$$= \boxed{67^{\text{th}}}$$

eg Given the list of data values below:

10 12 20 25 7 4 2 8

Find the percentile of 7.

S: Sort: 2 4 7 7 10 12 20 25

... percentile of 1.

S: sort: 2 4 7 8 10 12 20 25

$$\begin{aligned} \text{Percentile of 7} &= \frac{2}{8} \cdot 100\% \quad \leftarrow \begin{array}{l} 2, 4 \\ 2 \text{ of them} \end{array} \quad \leftarrow 8 \text{ of them} \\ &= 25\% \\ &= \boxed{25^{\text{th}}} \end{aligned}$$

eg Consider the list below, find the percentile of 16:

~~11, 2, 8, 17, 5, 10, 15, 7, 20, 13, 16, 18, 21, 4, 24~~

S: sort: 2, 4, 5, 7, 8, 10, 11, 13, 15, 16, 17, 18, 20, 21, 24
total 15

$$\begin{aligned} \text{Percentile of 16} &= \frac{9}{15} \cdot 100\% \quad \leftarrow \begin{array}{l} 2, 4, 5, 7, 8, 10, 11, 13, 15 \\ 9 \text{ of them} \end{array} \\ &= 60\% \\ &= \boxed{60^{\text{th}}} \end{aligned}$$

eg Find the percentile of the cookies with 24 chips:

19	19	20	20	20	20	22	22	22	22
23	23	23	23	23	23	23	24	24	24
24	24	25	25	25	25	25	25	25	26
26	26	26	26	26	27	27	28	28	30

← 10

40 total

$$\begin{aligned} S: P_{24} &= \frac{17}{40} \cdot 100\% \\ &= \underline{42.5\%} \quad \text{good to round} \end{aligned}$$

$$= 42.5\% \rightarrow \text{good to round}$$

$$\approx \boxed{43^{\text{rd}}}$$

eg Find the percentile of the cookies with 22 chips:

19	19	20	20	20	20	22	22	22	22
23	23	23	23	23	23	23	24	24	24
24	24	25	25	25	25	25	25	25	26
26	26	26	26	26	27	27	28	28	30

40

S:

$$P_{22} = \frac{6}{40} \cdot 100\%$$

$$= 15\%$$

$$= \boxed{15^{\text{th}}}$$

eg Find the percentile of the cookies with 19 chips:

19	19	20	20	20	20	22	22	22	22
23	23	23	23	23	23	23	24	24	24
24	24	25	25	25	25	25	25	25	26
26	26	26	26	26	27	27	28	28	30

S:

$$P_{19} = \frac{0}{40} \cdot 100\% \leftarrow \text{no number before 19}$$

$$= 0\%$$

$$= \boxed{0^{\text{th}}}$$

SAT
200-800
↑