Why not ask for Data in Numeric form Directly?
You might wonder why researchers don't just ask participants to provide data directly in numeric forms. for eg why not ask for height in inches right from the start?

- Reason for asking in familiar forms. People are not familiar with certain forms of data (eg height in feet and inches), and it's likely they will give more accurate responses when they are using measurements they are accustomed to

- Accuracy in Reporting: Asking someone to convert height to inches on the spot could introduce errors. for eg people may make mistakes in converting feet and inches into a single numeric value.

Basics of data collection: Measurement Examples

How much information should I Record?
Scenario:
You're volunteering at a track meet, and your task is to record the time each runner crosses the finish line.

The digital clock displays times with eight decimal places (e.g 22.93219780 seconds), but you decide to only record one decimal place (eg 22.9)

Issue:
- The first runner finishes with a time of 22.93219780 seconds, you record 22.9
- later, another runner finishes with 22.9 seconds, creating a tie in the record ties.

Problem: By rounding the time to only one decimal place, you've lost precision, which resulted in a mistake now based on data places are now tied, even though their actual performances were different

Lesson: This example emphasizes the importance of deciding how much detail is needed before you start collecting data. If you are uncertain about how precise your measurements should be, it's better to record more information than you think you might need.

Graphing Quantitative Variables

Quantitative variables are measured on a numeric scale, allowing for meaningful calculations such as averages, difference and correlations.

Here's a breakdown of different types of graphs used to represent quantitative data:

Date / /
Page No.

Stem and Leaf displays

A stem and leaf display is a way to organize and visualize numerical data, especially when dealing with small to moderate sized datasets.

How to Construct a Stem and Leaf Display

1. Identify the Stems and Leaves
   - The stem is the leading digits (eg tens place in 12, which is "1").
   - The leaf is the last digit (eg one place in 12, which is "2").
2. Organize the Data
   - Arrange numbers in Ascending order
   - Place the leaves next to the correct stems.

Example: Suppose we have these test scores

67, 72, 79, 81, 83, 89, 90, 91, 95

```
6 | 7
7 | 2 9
8 | 1 3 9
9 | 0 1 5
```

Variations of Stem and Leaf Displays

Handling Negative Numbers & Decimals

Examples: Suppose we have these values:

43.2, 42.9, 35.6, 25.6, 20.5, -6.3, -10.5, -27.4

Rounded to whole numbers

4 | 3 3
5 | 6
2 | 0 0 4 5 6
1 | 0 0 1 3 4
0 | 1 2 4 5 5 8 9
-0 | 0 6 7 9
-1 | 0 0 5 5 5 9
-2 | 7

2 Back to Back Stem and Leaf Displays

Used for comparing two sets of data side by side.

Example: comparing touchdown passes for two different years.

7	0
3 3 2	3 | 0 1 2
1 1	4 | 0
6 5	5 | 8
2 1	1 | 2
	3 | 0 2

Left side (998 data), Right side (2000 data)

Why use a stem and leaf Display?

- Retains actual data values (unlike histogram, which group data)
- Helps detect patterns, clusters and outliers
- Can be modified (eg splitting stems for clarity)

When to use a stem and Leaf Display?

✓ Best for datasets under 200 values.

✓ Great for comparing two distribution (back-to-back form)

✗ Not ideal for very large datasets (use histograms instead)

✗ Not effective if data has too many digits (rounding may be needed)

Summary of Histograms

A histogram is a graphical way to display the shape of a distribution. It is particularly useful for large datasets because it groups data into intervals, making patterns easier to see

Steps to Create a Histogram

1 Create a Grouped Frequency Distribution

Since a raw frequency table can be too large (especially with many unique values), we group data into intervals (class intervals)

Eg A psychology test had 642 student scores ranging from 46 to 167. The data was grouped into intervals of width 10 (eg 39.5 - 49.5, 49.5 - 59.5, etc)

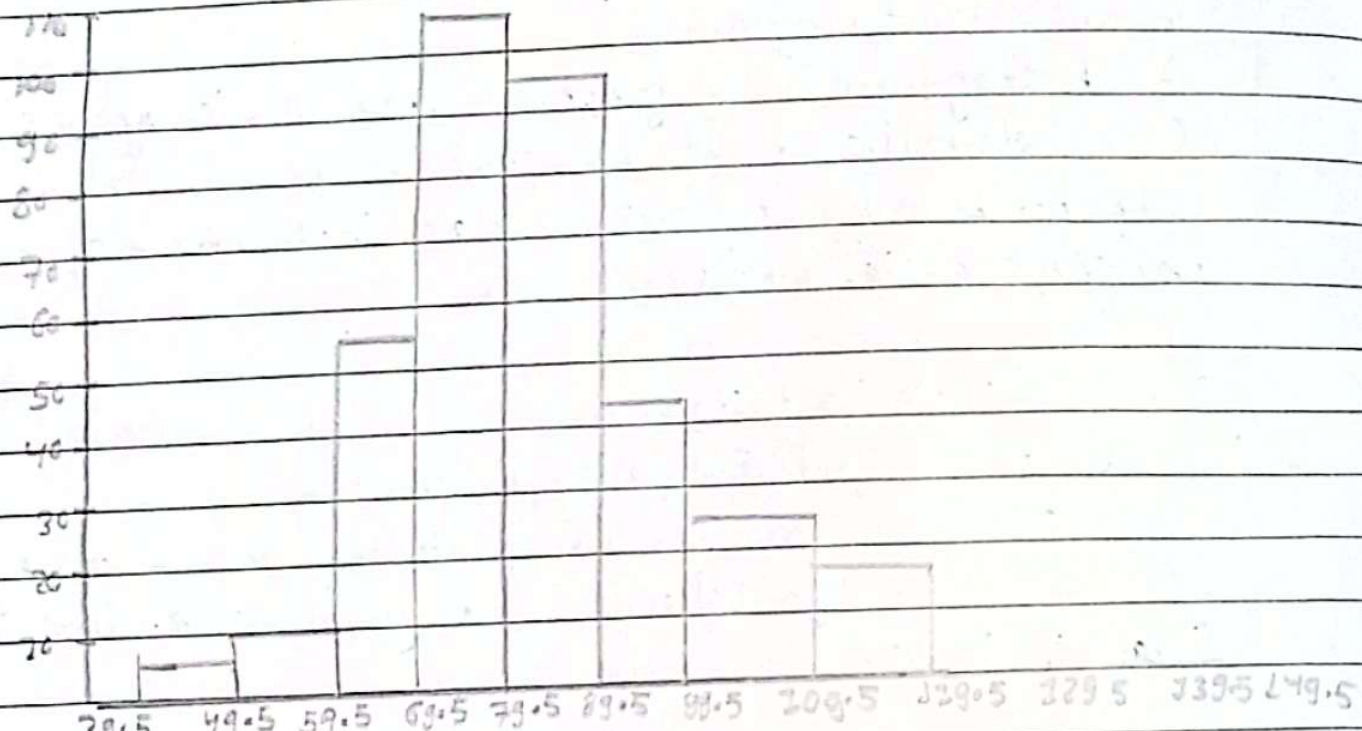
Frequency table example

Interval (lower limit - Upper limit)	Class frequency
39.5-49.5	3
49.5-59.5	10
59.5 -69.5	53
~~79.5~~ 69.5 - 79.5	107
...	...

Date / /
Page No.

7 Create the Histogram

- The x-axis represents the class interval
- The Y-axis represents the class frequency.
- Bars represent each class, with their height corresponding to frequency.



Key Observation from a data (Histogram)

- Shape of the Distribution (eg normal, skewed, uniform
- Skewness (if the data extends more on one side)
- Peaks (Modes) most common score range

The histogram of psychology test scores was skewed right, meaning more students scored lower, with fewer high scores.