

Board – CBSE

Class – 8th

Topic – Data handling (Theory)

Data:

The information collected by observation for experiments is called **data**.

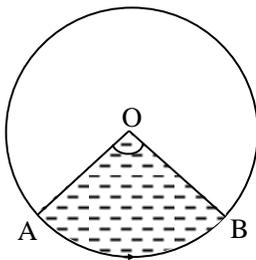
Data can represent graphically, by

- (i) Pictograph
- (ii) Bar Graph
- (iii) Double Bar Graph
- (iv) Histogram
- (v) Polygon (Class IX) and also, tabular form, by
 - (i) Raw data
 - (ii) Frequency distribution table, and by Pie Chart

Pictograph: Pictorial representation of data using symbols.

CIRCLE GRAPH OR PIE CHART

This is a very colorful way. A pie chart would mean that the data is represented in a circle and not as bars or lines. A circle has a center and the angle around the center is 360° . So, all the data will be represented in terms of angles. The circle is divided out into different parts. Each part is called a sector and the angle at the center is the central angle.



AOB is a sector where OA and OB are the radii and $\angle AOB$ is the central angle.

ORGANISING DATA

Data available to us is in an unorganized form called **raw data**. To draw meaningful inferences, we need to organize the data systematically. For example, a group of students was asked about their favorite subject. The results were as listed below:

Art, Mathematics, Science, English, Mathematics, Art, English, Mathematics, English, Art, Science, Art, Science, Science, Mathematics, Art, English, Art, Science, Mathematics, Science, Art.

Which is the most liked subject and the one least liked?

It is not easy to answer the question by looking at the choices written haphazardly.

We arrange the data in Table using tally marks.

Table

Subject	Tally marks	Number of students
Art		7
Mathematics		5
Science		6
English		4

The number of tallies before each subject gives the number of students who like that particular subject. This is known as the **frequency** of that subject.

Frequency gives the number of times that a particular entry occurs.

From Table

The frequency of students who like English is 4

The frequency of students who like Mathematics is 5

The table made is known as the **frequency distribution table** as it gives the number of times an entry occurs.

GROUPING DATA

The data regarding the choice of subjects showed the occurrence of each of the entries several times. For example, Art is liked by 7 students. Mathematics is liked by 5 students and so on (Table). This information can be displayed graphically using a pictograph or a bar graph. Sometimes, however, we have to deal with large data. For example, consider the following marks (out of 50) obtained in Mathematics by 60 students of Class VIII.

21, 10, 30, 22, 33, 5, 37, 12, 25, 42, 15, 39, 26, 32, 18, 27, 28, 19, 29, 35, 31, 24, 36, 18, 20, 38, 22, 44, 16, 24, 10, 27, 39, 28, 49, 29, 32, 23, 31, 21, 34, 22, 23, 36, 24, 36, 33, 47, 48, 50, 39, 20, 7, 16, 36, 45, 47, 30, 22, 17.

If we make a frequency distribution table for each observation, then the table would be too long, so, for convenience, we make groups of observations, say, 0-10, 10-20, and so on, and obtain a frequency distribution of the number of observations falling in each group. Thus, the frequency distribution table for the above data can be.

Groups	Tally marks	Frequency
0 - 10		2
10 - 20		10
20 - 30		21
30 - 40		19
40 - 50		7
50 - 60		1
	Total	60

Data presented in this manner is said to be **grouped** and the distribution obtained is called **grouped frequency distribution**. It helps us to draw meaningful inferences like-

- (1) Most of the students have scored between 20 and 40
- (2) Seven students have scored more than 40 marks out of 50 and so on.

Each of the groups 0-10, 10-20, 20-30, etc., is called a **Class Interval** (or briefly a class).

1. **Upper limit & Lower limits:** The value of classes from above examples 0, 10, 20, 30, 40, 50 are lower class limits, and 10, 20, 30, 40, 50, 60 are called upper-class limits.

i.e. 0 - 10
 ↓ ↓
 Lower Upper

***Upper limit element is always counted in the next class.**

2. **Class Interval:** (Upper Limit-Lower limit) is called a class interval. In above e.g. class interval is 10 for all classes. This interval is called class width or the size of the class.
3. **Class marks or mid points:**

The mean number of both upper limit & lower limit for each class.

i.e., If a class is "x - y" then class mark = $\frac{x+y}{2}$

4. Range:

The range of frequency distribution data is equal to the upper limit of the last class – the lower limit of the first class.

CHANCE AND PROBABILITY

❖ **Experiment:** An operation which can produce some well-defined outcome(s)

❖ **Types of experiment:**

(i) **Deterministic experiment**

(ii) **Random experiment**

(i) **Deterministic experiment:** An experiment that has a fixed outcome or result no matter the number of times they are repeated, is known as a deterministic experiment.

Eg. From the set of all triangles in a plane, if a triangle is chosen at random, then even without knowing the measure of the three angles, we can definitely say that the sum of the measures of the angles is 180° .

(ii) **Random experiment:** If an experiment, when repeated under identical conditions, does not produce the same outcome every time but the outcome in a trial is one of the several possible outcomes then such an experiment is known as a random experiment. In other words, an experiment whose outcomes cannot be predicted in advance is called a random experiment.

❖ **Outcomes:** The possible results is/are called the outcome for any experiment.

❖ **Elementary events:** If a random experiment is performed, then each of its outcomes is known as an elementary event.

❖ **Sample space:** The set of all possible outcomes of a random experiment is called the sample space.