

INTRODUCTION

Date :

Data is the collection of information or facts. It may be a collection of numbers, figures, words or symbols.

Raw Data :

The data that has been collected in the original form is called raw data.

For example :

The marks obtained by 50 students in the Social Studies exam are 60, 40, 35, 27, 67, 72, 40, 37, 45, 50, 52 and so on up to 50 items.

This collection of data is raw data.

Observation :

Each of the items in the raw data is called an observation. The marks of each student stands for an observation in the raw data.

Type of Data :

- There are two types of data primary data and secondary data.
- Primary data is the data collected directly from the source.
- Secondary data is the data collected from secondary sources such as the internet, TV, libraries, newspapers. etc

For example :

Mr Sen asks the students to give their choice for the particular location they would like to go, the games they would like to play, the type of food they would like to have on their trip, he is getting the information directly from the source. This is **primary data collection**. When he is collecting information about weather, or accommodation facilities. he may collect these from the internet, travel brochures, newspapers, magazines, television and other sources. These sources are secondary sources is called **secondary data**.

Organisation of Data :

To draw a meaningful conclusion from the data, the data must be organized. Understanding and analyzing the data becomes easier when it is represented by pictures or tables.

Tabular form :

Consider the data given here 75%, 88%, Devan, Charu, Sajita, Arvind, 70%, 60%, 83%, 90%, 94%, Greg, Manisha, Vijayan, Ahmed, Raghu, Neetu, 66%, 77%, 72%. This is raw data.

The data given above are facts in words and figures. Unless the available data is property presented, we cannot get meaningful information from it. Given below is a tabular representation of the above data. This makes the information easy to understand.

Names of students	Percentage of marks obtained
Arvind	66%
Charu	83%
Deven	75%
Greg	88%
Manisha	72%
Ahmad	60%
Neetu	94%
Raghu	77%
Sajita	90%
Vijayan	70%

Frequency distribution :

Let us study the peak hour traffic at a road junction to share it with the town or city addministrators to help them develop that junction for easy traffic flow. We need to collect the data about the number of trucks, cars, other motor vehicles, and cycles passing through that junction during a fixed period at the peak hour.

We will try to find the number of vehicles passing through that junction during the peak interval of 9.00 a.m. to 9.30 a.m.

Peak hour traffic during 9:00 a.m. to 9:30 a.m. on 3-3-2009					
Vehicles	Tally	Frequency			
Trucks		17			
Cars	$\mathbb{M} \mathbb{M} \mathbb{M} \mathbb{M} \mathbb{M} \mathbb{M} \mathbb{M} \mathbb{M} $	33			
Rickshaws	$\mathbb{M} \mathbb{M} \mathbb{M} \mathbb{M} \mathbb{M} \mathbb{I}$	24			
Motor cycles/Scooters		36			
Cycless		32			
	Total	142			

For this you have to prepare a data collection sheet.

You find here two new words tally and frequency. Tally is a mark 'I' we put in the chart against each item. For example, if a car passes the junction, we mark one tally 'I' in the box against car. When four cars have passed, the tally will look like this "III". When the fifth car passes, we do not write 'IIIII' but we

put a cross across the four tallies like \mathbb{N} . This forms a group of 5. Similarly, ' $\mathbb{N} \mathbb{N}$ ||' will be two fives and two, i.e., 12. The total value of the tallies in each row tells us the number of the particular type of vehicle which passed through that junction. In general, the tally mark represents the number of times that particular situation happened. This is called the frequency of that event or that happening. In the case of trucks, 17 trucks passed through that junction between 9.00 a.m. and 9.30 a.m. Thus the frequency of the trucks passing during 9.00–9.30 is 17. And the frequency for cars is 33, and so on. Finally the investigation or data collection chart will look like this.

Representation of Data :

We have learnt how to collect the information and how to organize it using a frequency table. To represent the study of this data, we can draw graphs for this data. Pictographs and bar graphs are simple ways of representing this data.

PICTOGRAPH

A pictograph is the way of representing data using pcitures.

In a school compound, there are 5 Neem trees, 4 Coconut trees and 3 Ashoka trees.

Let us represent the above data by a pictograph.

Trees in the school compound

Neem tree	-	-	P	P	Þ
Coconut tree	T?	M	70	N	
Ashoka tree	1	*	\$		

Let us now suppose that there are 40 neem trees, 24 coconut trees and 32 ashoka trees, you cannot draw each picture for each tree. So we take a convenient scale. Let us consider that each tree drawn represents 8 actual trees. 40 neem trees well become 5 trees drawn. Similarly, 24 coconut trees will be 3 and 32 ashoka trees will be represented by 4 trees. Now it is convenient to draw a graph.

Ex.



Neem tree	Þ	Ś	æ	Þ	-
Coconut tree	观	R	Ŵ		Sa I
Ashoka tree	\$	\$			

Make sure that each picture must be one below the other. Reading and intrepreting pictograph :

Reading a pictograph helps in intrepreting the pictograph so as to get information from it. Given below is a pictograph of ages of students in a class of 51 students.

Key : • represents 3 students

60	months	old	••
61	months	old	•••
62	months	old	• • • • •
63	months	old	• • • •
64	months	old	••
65	months	old	•
60	months	old	2×3 = 6
61	months	old	3 × 3 = 9
62	months	old	5 × 3 = 15
63	months	old	4 × 3 = 12
64	months	old	2 × 3 = 6
65	months	old	$1 \times 3 = 3$

Answer the following questions.

- (i) What is the total number of students ?
- Sol. represent 3 students and here we have 17 such
- \therefore Total no. of students = 17 × 3 = 51
- (ii) Which age group has the lowest number of students ? How many students are there in group.
- **Sol.** 65 month old age group has the lowest number of students. Three students are there in group.
- (iii) Which age group has the highest number of students ? How many students are there in the group ?
- **Sol.** 62 months old age group has the highest number of students. 15 students are there in the group.
- (iv) How many students are there, who are 62 months and below ?
- **Sol.** represents 3 students and here we have 10 such• who are 62 months and below
 - :. Total no, of students who are 62 months & below = $10 \times 3 = 30$
- (v) How many students are 62 months and above ?
- Sol. represents 3 students and here we have 12 such
 - who are 62 months and above
 - \therefore Total no. of students who are 62 months & above = $12 \times 3 = 36$
- (vi) How many students are between the age of 61 months and 64 months ?
- **Sol.** represent 3 students and here we have 9 such who are between the age of 61 months and 64 months
 - \therefore Total no. of students who are between the age of 61 months and 64 months = 9 × 3 = 27.

BAR GRAPH

When the given data is large and also not in multiples of a number, it is difficult to draw pictographs. When numerial data is presented as columns on a graph, this graphical representation of data is called a **bar graph**. It is also known as column graph.

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Properties of Bar Graphs :

In a bar graph, the columns are drawn such that :

- (a) Each column is of equal width.
- (b) There is equal space between each column.
- (c) The height of each column indicates the value of data such that if a perpendicular is drawn from its top to ray OY, the percentage of marks represented by the column can be read off.
- (d) All bars or columns are draw on the same common base.
- (e) To make the bar graph attractive, the bars may be coloured.
- (f) Bars are very helpful for visual comparison of data.

Construction of a bar graph :

STEPS :

1. On the graph paper draw a horizontal line (x-axis) and a vertical line (y-axis)

2. Along the horizontal line, mark points at equal distances and write the names of the items for which the data is to be represented.

- 3. Choose a suitable scale which shall determine the height of the bars,
- 4. Locate the heights of different bars according to scale.
- 5. On x-axis draw bars of equal width according to the required height.
- 6. Keep the distance between the bars the same.
- **Ex.** Look at the frequency chart representing the number of tourists staying in Hotal Raj Mahal in Shimla for 5 months : March, April, May, June and July.

Months	Tourists	
March	120	
April	180	/
Мау	240	
June	210	
July	120	

Take a graph paper or a squared paper. Draw a horizontal axis at the bottom. On the lift side draw a vertical axis. Take an appropriate scale. In this case, let it be 1 division (1 centimetre) equal to 15 tourists.



On the horizontal axis, represent the five months separately with equal width and equal distances between them.

Reading of bar graphs :

Reading of the bar graph is the process of interpreting the bar graph to gather information.

Ex. Read the bar graph given below and answer the following questions.



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EXERCISE

OBJECTIVE TYPE



If one symbol \oplus represents 10 animals, the total number of symbols required to represent animals for village C will be :

(A) 5 (B) 7 (C) 8 (D) 9

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Q.8 The following pictograph shows the number of varieties of apples stored in a supermarket. The total number of apples stored in the supermarket is





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Q.3 Draw the bar graph of the following data.

Pupils	Weight (inkg)
Anil	35
Arun	29
Sudhir	38
Naresh	32
Prem	22
Bobby	25

Q.4 Draw the bar graph of the following data

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Players	Runs Scored				
Sachin Tendulkar	120				
Saurav Ganguly	85				
Rahul Dravid	60				
Verender Sehwag	82				
Yuvraj	47				
Mohd. Kaif	58				

Cricket club members attendance

Q.5 Read the graph and answer.

Fill in the chart and prepare a frequency table.

25 20 15

Attendance 0 ^G 01

Mon

Days

Tue

Monday Tuesday Wednesday Thursday Friday

Wed

Thu

Fri

>

Q.6 A class took a vote to decide where to go for a trip.



(a) How many students are there in the class ?

- (b) Where did the majority of students want to go?
- (c) Which was the second choice ?
- (d) How many students voted for water park ?

Q.7 Make a bar graph for the following data.

(a) The table shows the number of books read by the class in the past month.

(hours)

Number of students	2	6	9	10	4	1
Books read	1	2	3	4	5	6

(b) This is the daily routine of Shankar. Make a bar graph representing the time and activities.

Activity		Tin	۱e
School		6	
Sleeping		9	
Playing + hobby		3	
TV watching		2	
Eating + Drinking		1	
Other activities		3	
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(c) This is the result of a traffic survey conducted by Anil in front of his village house for 1 hour.

Cars	Buses	Lorries	Motorbikes	Bicycles
27	. 12	15	30	40

(d) For the 'Marathon Run for Peace' programme a big group of children took part. The age—wise details of participants are given below.

7 years	8 years	9 years	10 years	11 years
100	150	250	200	75

Q.8 The following pictograph represents the number of cycles produced in a factory during 2004–2008. Read the pictograph to answer the questions given below.

Number of Cycles

- (a) How many cycles were produced in 2007?
- (b) How many cycles were produced in 2005?
- (c) In which year was the production of cycles the lagest ?
- Q.9 The music group of Class VI of St. George's School performed a musical programme. The students of Class VII were asked to grade the programme in a scale of 5 where 1 represents excellent performance, 2 good, 3 ordinary performance, 4 not good, 5 very poor show. This is the result of 80 students of Class VI.

Prepare a frequency table using tally marks.

ANSWER KEY-1

0	В	J	Е	C	Т	T	v	Έ	:
•	_	-	_	-	-	-	-	_	

1.	С	2.	С	3.	А	4.	С	5.	D	6.	С	7.	D
8.	A	9.	А	10.	A	11.	С	12.	D				

SUBJECTIVE :

- 1. (i) maximum number of families with different number of members in family
 - (ii) 50
 - (iii) 3, 120
 - (iv) 8, 9, 10; 10
- 5. Monday (10), Tuesday (15), Wednesday(10), Thursday (20), Friday(15)
- **6.** (a) 48 (b) Water park
 - (c) Sea side (d) 16

- **8.** (a) 18000 (b) 14000
 - (c) 2007

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- **15**. The data can be arranged in a tabular form using _____ marks.
- **16.** A ______ represents data through pictures of objects.
- **17**. In a bar graph, _____ can be drawn horizontally or vertically.
- **18.** In a bar graph, bars of ______ width can be drawn horizontally or vertically with ______ spacing between them.
- **19.** An observation occurring seven times in a data is represented as ______ **L**using tally marks.
- 20. In a pictograph, if a symbol represents 20 flowers in a basket then stands for
- 21. On the scale of 1 unit length = 10 crore, the bar of length 6 units will represent _____ crore and of _____ units will represent 75 crore.
- In an examination, the grades achieved by 30 students of a class are given below. Arrange these grades in a table using tally marks:
 B, C, C, E, A, C, B, B, D, D, D, D, B, C, C, C, A, C, B, E, A, D, C, B, E, C, B, E, C, D
- 23. The number of two wheelers owned individually by each of 50 families are listed below. Make a table using tally marks.
 1, 1, 2, 1, 1, 1, 2, 1, 2, 1, 0, 1, 1, 2, 3, 1, 2, 1, 1, 2, 1, 2, 3, 1, 0, 2, 1, 0, 2, 1, 2, 1, 2, 1, 1, 4, 1, 3, 1, 1, 2, 1, 1, 1, 1, 2, 3, 2, 1, 1
 Find the number of families having two or more, two wheelers.
- 24. The lengths in centimetres (to the nearest centimetre) of 30 carrots are given as follows: 15, 22, 21, 20, 22,15, 15, 20, 20,15, 20, 18,20, 22, 21, 20, 21, 18, 21, 18, 20, 18, 21, 18, 22, 20, 15, 21, 18, 20
 Arrange the data given above in a table using tally marks and answer the following questions. (a) What is the number of carrots which have length more than 20 cm?
 (b) Which length of the carrots occur maximum number of times? Minimum number of times?
- **25**. Thirty students were interviewed to find out what they want to be in future. Their responses are listed as below:

doctor, engineer, doctor, pilot, officer, doctor, engineer, doctor, pilot, officer, pilot, engineer, officer, pilot, doctor, engineer, pilot, officer, doctor, officer, doctor, pilot, engineer, doctor, pilot, officer, doctor, pilot, doctor, engineer

Arrange the data in a table using tally marks.

26. Following are the choices of games of 40 students of Class VI:

football, cricket, football, kho-kho, hockey, cricket, hockey, kho-kho, tennis, tennis, cricket, football, football, hockey, kho-kho, football, cricket, tennis, football, hockey, kho-kho, football, cricket, cricket, football, hockey, kho-kho, tennis, football, hockey, cricket, football, hockey, cricket, football, kho-kho, football, cricket, hockey, football.

(a) Arrange the choices of games in a table using tally marks.

- (b) Which game is liked by most of the students?
- (c) Which game is liked by minimum number of students?

27	Fill in the blanks in the following	a table which	represents shirt size of	40 students of a school
~ / .				

Shirt size	Tally Marks	Number of students
30	Ш	3
32	THJ	_
34	_	8
36		
38	MU —	10
40	_	7

Following pictograph represents some surnames of people listed in the telephone directory of a city 28.



- Observe the pictograph and answer the following questions: (a) How many people have surname 'Roy'? (b) Which surname appears the maximum number of times in the telephone directory?
- (c) Which surname appears the least number of times in the directory?
- (d) Which two surnames appear an equal number of times?



29. Students of Class VI in a school were given a task to count the number of articles made of different materials in the school. The information collected by them is represented as follows:

Material usedArticlesWoodGlassMetalRubberPlastic

Observe the pictograph and answer the following questions:

- (a) Which material is used in maximum number of articles?
- (b) Which material is used in minimum number of articles?
- (c) Which material is used in exactly half the number of articles as those made up of metal?
- (d) What is the total number of articles counted by the students?
- **30.** The number of scouts in a school is depicted by the following pictograph:



Observe the pictograph and answer the following questions:

- (a) Which class has the minimum number of scouts?
- (b) Which class has the maximum number of scouts?
- (c) How many scouts are there in Class VI?
- (d) Which class has exactly four times the scouts as that of Class X?
- (e) What is the total number of scouts in the Classes VI to X?



31. A survey was carried out in a certain school to find out the popular school subjects among students of Classes VI to VIII. The data in this regard is displayed as pictograph given below:

Subject	Number of Students = 50 students	
Hindi		
English	\bigcirc \bigcirc \bigcirc	
Mathematics	\bigcirc \bigcirc \bigcirc \bigcirc \bigcirc	
Science		
Social Studies		

- (a) Which subject is most popular among the students?
- (b) How many students like Mathematics?
- (c) Find the number of students who like subjects other than Mathematics and Science.
- **32.** The following pictograph depicts the information about the areas in sqkm (to nearest hundred) of some districts of Chhattisgarh State:

District	Area (in km²)	🚫 = 1000sqkm
Raigarh		5
Rajnandgaon	00000000	
Koria	\odot	
Mahasamund	\otimes \otimes \otimes \otimes \otimes	
Kabirdham	\odot	
Jashpur		5

- (a) What is the area of Koria district?
- (b) Which two districts have the same area?
- (c) How many districts have area more than 5000 square kilometres?

33. The number of bottles of cold drinks sold by a shopkeeper on six consecutive days is as follows:

Day	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Number of bottles	350	200	300	250	100	150

Prepare a pictograph of the data using one symbol to represent 50 bottles.

34. The following table gives information about the circulation of newspapers (dailies) in a town in five languages.

Language	English	Hindi	Tamil	Punjabi	Gujarati
Number of	5000	8500	500	2500	1000
newspapers					

Prepare a pictograph of the above data, using a symbol of your choice, each representing 1000 newspapers.

35. Annual expenditure of a company in the year 2007-2008 is given below:

Items	Expenditure (Rs in lakh)
alaries of employees	65
dvertisement	10
urchase of machinery	85
lectricity and water	15
ransportation	25
ther expenses	30

Prepare a pictograph of the above data using an appropriate symbol to represent Rs 10 lakh.

36. The following bar graph shows the number of houses (out of 100) in a town using different types of fuels for cooking.



(a) Which fuel is used in maximum number of houses?

(b) How many houses are using coal as fuel?

(c) Suppose that the total number of houses in the town is 1 lakh. From the above graph estimate the number of houses using electricity.

37. The following bar graph represents the data for different sizes of shoes worn by the students in a school. Read the graph and answer the following questions.

Scale : 1 unit length = 50 students



(a) Find the number of students whose shoe sizes have been collected.

- (b) What is the number of students wearing shoe size 6?
- (c) What are the different sizes of the shoes worn by the students?
- (d) Which shoe size is worn by the maximum number of students?
- (e) Which shoe size is worn by minimum number of students?

(f) State whether true or false:

The total number of students wearing shoe sizes 5 and 8 is the same as the number of students wearing shoe size 6.

1. D 2. D 3. D 4. D 5. C