Chapter 15

Data Handling

15.1 In your previous class, you have learnt about the basic idea of 'Data'. We studied about tally marks, graphs and pictographs. In this chapter, we will take one more step towards learning how to organize data.

Take a coin and toss it 20 times. List the outcome so obtained (head or tail) in your notebook. Kishan writes down in his notebook:

T T H H T T T H T H H T T H T H H H T T

This data is obtained when Kishan tossed the coin 20 times.

Make a note of ages of your friends in your class.

.....Is it a kind of data?

Janaki's favourite dessert is jalebi. Is it a data too?

No, this is not a data because only Janaki's choice is asked.

If instead, a group's choice would have been asked and recorded, would that be considered as a data?

S.No.	Statements	It is a data / It is not a data
1	Number of students in your class	Not a data
2	Class wise number of students from class VI to XII, who come to school by walking	
3	Number of schools in your town	
4	Number of animals in your neighbourhood	
5	Weight of your family members	
6	Number of brick houses and number of huts in your town	
7	Age of your class teacher	

Classify the following statements whether it is a data or not:

Make some more statements by yourself, and decide whether they are data or not.

(Questions and examples quoted in this chapter are only to create a base for teachers and students. Present some relevant and local situations, statements and questions to make the environment of the classroom lively.)

15.2 Types of data.

Shabnam and Sushil are student's forum's president and prime minister respectively. They required data regarding the number of students present in each class today. Shabnam went to each class of the school to collect the data. Instead, Sushil went to Headmaster's room and collected the data from the records there. Data collected by both of them were similar. Here, Shabnam collected the data by herself. Hence, this is called Primary Data for her. Instead, Sushil collected this information from the records maintained in the Headmaster's room. Hence, this is called Secondary Data for him. Government sends its representatives to each and every home to gather population data. Hence, this data is primary data for the government. But when the same population data is used by other organizations for other purposes, it becomes secondary data for them.

Gather the following data from each teacher of your school:

Name of the teacher: .....

Post .....

Educational Qualification: .....

Subject taught by him/ her: .....

Teaching Experience:.....

Age: .....

The data collected by you in this activity, is primary data for you. Can you tabulate this information?

If you collect some information regarding each student of your class through the students' reports section of students' attendance register of your class, then it becomes secondary data for you.

15.3 Organization of data

15.3.1 It was decided to distribute sweets of their own choice among the students on the eve of annual function. Information was gathered from each student about his or her choice of sweet.

Following symbols were used:

Jalebi – J Laddu – L Barfi – B Gulabjamun – G

Following is the choice of sweets of 20 students of Class VI:

G, J, J, L, J, G, B, B, J, L, J, B, B, L, J, B, J, G, G, B

Shashi used the following method to represent data:

J – 7 L – 3 B – 6 G – 4

Vikas used the following method to represent data:

Name of the sweet	Number of students who like it
Jalebi – J	✓✓✓✓✓✓✓
Laddu – L	✓✓✓
Barfi – B	✓✓✓✓✓✓
Gulabjamun – G	✓✓✓✓

Rohit used the following method to represent data:

Name of the sweet	Tally Marks	Number of students who like it
Jalebi – J	𝍸 𝍸 ||	7
Laddu – L	𝍸 |	3
Barfi – B	𝍸 𝍸	6
Gulabjamun – G	𝍸	4

Rajul used the following method to represent data:

Name of the sweet	Tally Marks	Number of students who like it
Jalebi – J	𝍸 ||	7
Laddu – L	|||	3
Barfi – B	𝍸 |	6
Gulabjamun – G	||||	4

Here, we see four different types of methods and conclude that Rajul's method is most appropriate because it is easier to count the groups of five.

15.3.2 Kareena threw a dice 30 times and noted the number appearing each time as shown below :

3, 6, 5, 4, 4, 3, 6, 5, 3, 6, 2, 3, 1, 6, 4, 1, 3, 6, 1, 1, 2, 4, 4, 3, 3, 4, 2, 1, 2, 1

Kareena wanted to extract following information:

1. The number that appeared the maximum number of times.
2. The number that appeared the minimum number of times.
3. Difference between the number of times odd numbers have appeared and number of times even numbers have appeared.

Kareena prepared the table using tally marks:

Digit of the dice occurred	Tally Marks	Frequency
1	𝍸 I	6
2	IIII	4
3	𝍸 II	7
4	𝍸 I	6
5	II	2
6	𝍸	5

Now, the information can be easily interpreted from the above table. Do similar activities in your classroom.

15.4 Pictograph

Students were sitting in five rows in a class.

Row No.	☺ = 1 student
1	☺ ☺ ☺ ☺
2	☺ ☺ ☺ ☺ ☺
3	☺ ☺ ☺
4	☺ ☺ ☺ ☺
5	☺ ☺

(i) In which row, maximum number of students are sitting?

(ii) In which row, minimum number of students are sitting?

(iii) In which rows, equal number of students are sitting?

You can answer these questions by just studying above diagram. The picture visually helps you to understand the data. It is a pictograph. A pictograph represents data through pictures of objects. It helps answer the questions on the data at a glance.

Let's go through more examples:

The following pictograph shows the number of students who like to play different sports in a class of 40 students:

Favourite sport	Number of students who like it. ☺ = 1 student
Kho Kho	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
Football	☺ ☺ ☺ ☺ ☺
Volleyball	☺ ☺ ☺ ☺ ☺ ☺ ☺
Badminton	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
Hockey	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺

What can you conclude from the pictograph?

(i) 8 students like to play kho kho.

(ii) Students' most favourite sport is badminton. 11 students like to play badminton.

(iii) Least number of students like to play football.

The following pictograph shows number of various trees planted in a school. Observe the pictograph carefully and answer the following questions:

Type of tree planted	Number of trees planted 🌴 = 5 trees
Guava	🌴 🌴 🌴 🌴 🌴 🌴
Banana	🌴 🌴 🌴
Papaya	🌴 🌴 🌴 🌴 🌴
Orange	🌴 🌴 🌴 🌴

(i) Number of Guava trees planted.

(ii) Number of Orange trees planted.

(iii) 15 trees are planted of which fruit?

(iv) What is the difference between number of papaya trees planted and number of banana trees planted?

Do and Learn.

Divide the students into small groups in you class. One by one, each student will create a situation and will prepare a pictograph. Based on the pictograph, the student will a ask few questions and the group members will try to answer those questions.

Following pictograph shows the number of patients admitted in a hospital due to road accidents.

Type of road accident	Number of patients  = 100 patients
Collision between two vehicles	
Tyre burst	
Skidding of two wheelers	
Wrong lane/ way driving	
Crossing the road	

(i) Which type of road accident resulted in maximum number of patients?
(ii) Which type of road accident resulted in minimum number of patients?
(iii) What is the total numbers of patients due to all of the road accidents?

Complete the table given below on the basis of above pictograph:

Type of road accident	Number of patients
Collision between two vehicles	
Tyre burst	More than 100 but less than 200
Skidding of two wheelers	
Wrong lane/ way driving	100
Crossing the road	

Do and Learn.

Gather the information regarding the source of income of 200 persons in your town. Show the data in a pictograph.

Exercise 15.1

1. Identify the primary and secondary data from the following:
   (i) Numbers of students present from each class during Morning Prayer on a particular day.
   (ii) Numbers of students from each caste gathered from the students' attendance register of class VI.
   (iii) Number of vehicles passing through a road between 9 am to 11 am on a particular day.
   (iv) Listing the distances of Jaipur from major towns of Rajasthan after looking at a map.

2. Following is the data about the ages of 30 students of class VI. Prepare a table using tally marks.

   11, 12, 11, 13, 14, 11, 12, 13, 15, 13, 13, 16, 14, 13, 14,
   13, 12, 14, 13, 12, 14, 13, 13, 12, 14, 14, 13, 12, 13, 14

   (i) How many students have completed 13 years of age?
   (ii) Maximum number of students are of which age?
   (iii) How many students have not yet completed 14 years of age?

3. 25 students participated in an Essay Competition on the topic 'Clean India - Healthy India'. Following is the data about their marks obtained out of maximum marks 10.

   6, 7, 7, 5, 8, 9, 8, 6, 7, 5, 8, 6, 6, 5, 4, 7, 6, 8, 8, 9, 7, 5, 9, 8, 10

   Prepare a table using tally marks and answer the below questions:
   (i) Number of students who obtained less than or equal to 6 marks.
   (ii) Number of students who obtained more than 6 marks.
   (iii) Number of students who obtained 8 marks.

4. Number of members in five families are depicted by the following pictograph

Family	Symbol ☺ = 1 member
A	☺ ☺ ☺ ☺ ☺
B	☺ ☺ ☺ ☺
C	☺ ☺
D	☺ ☺ ☺ ☺ ☺ ☺
E	☺ ☺ ☺ ☺

Observe the pictograph and answer the following questions:

(i) Which family has maximum members?

(ii) Which family has minimum members?

(iii) What is the difference between number of family members of families D and C?

(iv) How many total number of members in all the five families?

5. The pictograph below shows how many envelops were sold by a post office during a week. Use the pictograph to answer the questions.

Day	Symbol ✉ = 5 envelops
Monday	✉ ✉ ✉ ✉ ✉ ✉ ✉
Tuesday	✉ ✉ ✉ ✉
Wednesday	✉ ✉ ✉ ✉ ✉
Thursday	✉ ✉ ✉ ✉ ✉ ✉
Friday	✉ ✉ ✉
Saturday	✉ ✉

(i) How many envelops were sold on Wednesday?

(ii) On which day, maximum number of envelops were sold?

(iii) If cost of one envelop is Rs. 5, find the revenue generated by selling envelops on Monday.

(iv) How many envelops were sold during the week? Find the revenue generated by selling envelops during the week.

6. The following pictograph shows the number of students who like to play different sports in a class of 30 students:

Favourite sport	Number of students who play it. 🧍 = 1 student
Football	🧍 🧍 🧍 🧍 🧍 🧍
Kho Kho	🧍 🧍 🧍 🧍 🧍 🧍 🧍 🧍
Volleyball	🧍 🧍 🧍 🧍 🧍
Cricket	🧍 🧍 🧍 🧍 🧍 🧍 🧍 🧍 🧍 🧍 🧍

(i) How many students play Kho-Kho?

(ii) Which sport is played by maximum number of students?

(iii) How many students play none of the sports?

5.4.1 Drawing a Pictograph.

Drawing a pictograph is interesting.

Let's take an example. Availability of drinking water is continuously decreasing. The government decided to identify those sources of drinking water which are getting polluted. The following table depicts the number of polluted sources in a district.

Source of drinking water getting polluted	Number
Wells	8
Ponds	4
Hand pump	5
Dam	3
Bore well	6

Prepare a pictograph of sources using one symbol  to represent 1 source.

Solution

Source of drinking water getting polluted	Number Symbol  = 1 source
Wells	
.....	
Hand pump	
.....	
.....	

(i) Radhika left the pictograph incomplete. Can you complete it?

(ii) If symbol  would represent 10 sources, what would have been the data for the district? Show in a table.

Total number of students in a class is 40. The table below shows how many students of that class took mid day meal during a week. Represent it by a pictograph.

Day	Number of students who took mid day meal
Monday	35
Tuesday	31
Wednesday	37
Thursday	33
Friday	34
Saturday	36

Solution If we indicate 5 students with symbol ✻, then

Symbol for 4 students ✻

Symbol for 3 students ✻

Symbol for 2 students ✻

Symbol for 1 student ✻

So, we can represent the data in the following pictograph:

Day	Number of students who took mid day meal
Monday	✻ ✻ ✻ ✻ ✻ ✻ ✻
Tuesday	✻ ✻ ✻ ✻ ✻ ✻ ✻
Wednesday	✻ ✻ ✻ ✻ ✻ ✻ ✻ ✻
Thursday	✻ ✻ ✻ ✻ ✻ ✻ ✻
Friday	✻ ✻ ✻ ✻ ✻ ✻ ✻
Saturday	✻ ✻ ✻ ✻ ✻ ✻ ✻ ✻

Following table depicts number of bags of fortified wheat flour purchased for an 'Aangan Baadi Centre' in 8 months of a particular year.

Month	Number of bags
March	200
April	250
May	250
June	210
July	300
August	345
September	205
October	340

Represent the above data by a pictograph.

Symbol  = 100 bags

Month	Number of bags
March	
April	
May	
June	
July	
August	
September	
October	

Picturising for March, April, May and July is not difficult. But representing 210, 340, 345 and 205 with the pictures is not easy. We may round off 10 & 5 to 0 and 45 to 50.

Exercise 15.2

1. At a primary healthcare centre, numbers of patients treated for common flu during a week are recorded in the table given below. Prepare a pictograph indicating 5 patients with a symbol of 1 tablet.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
25	30	15	30	25	20	25

2. Following is the choice of subjects of 25 students of Class VI:

Hindi, Mathematics, English, Science, English, Hindi, Sanskrit, Mathematics, Computer Science, Social Studies, Science, Mathematics, Hindi, Mathematics, Science, Mathematics, English, Hindi, English, Hindi, Mathematics, Science, Mathematics, Computer Science, Mathematics.

Tabulate the above data in a frequency table with the help of tally marks. Which subject is most preferred?

Which subject is least preferred?

3.Number of votes secured by candidates contesting for Panchayat election under following election symbols are:

Election Symbol	Cycle	Television	Ball	Fan
Number of votes secures	250	300	350	250

Prepare a pictograph choosing the scale of your choice and answer the following questions:

(i) Which election symbol's candidate won the election?

(ii) What is the difference between number of votes secured by winner candidate and first runner up candidate?

4. Following is the data regarding measures of heights of students (in cm) in a class:
148, 150, 152, 149, 151, 154, 153, 152, 150, 149, 148, 152, 153, 154, 152, 151, 152, 153, 152, 152, 153, 151, 152, 153

(i) Prepare a frequency table using tally marks for the above measures of heights.

(ii) Prepare a pictograph choosing the scale of your choice.

(iii) Find the measure of height of the tallest student.

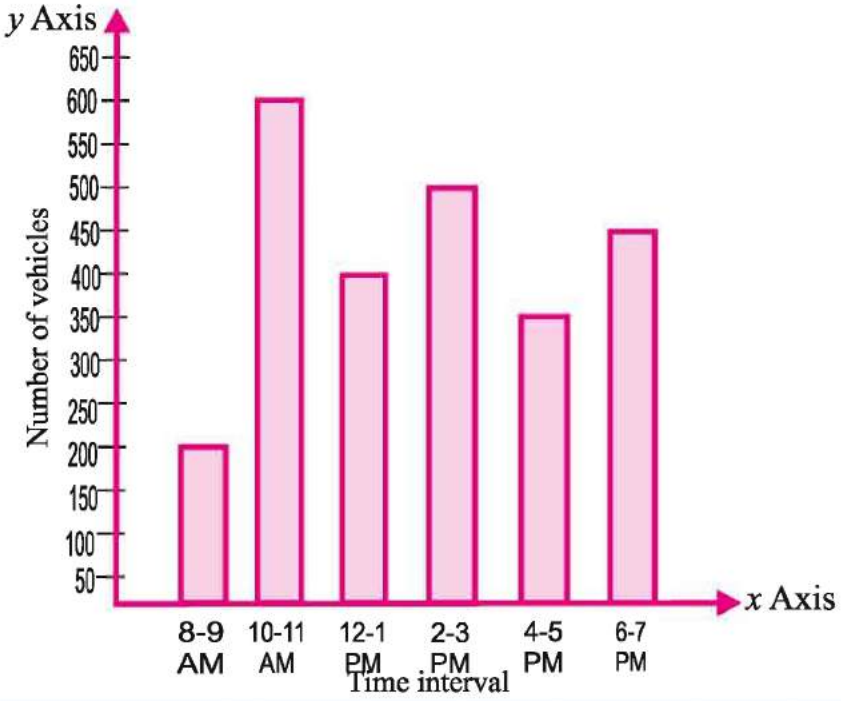
(iv) Find the difference between measures of heights of tallest student and shortest student.

15.5 Bar Graph.

Representing data by pictograph is not only time consuming but at times difficult too. Let us see some other way of representing data visually. Bars of uniform width can be drawn horizontally or vertically with equal spacing between them and then the length of each bar represents the given number. Such method of representing data is called a bar diagram or a bar graph.

15.5.1 Interpretation of a Bar Graph

Let us look at the example of vehicular traffic at a busy road crossing in Jaipur, which was studied by the traffic police on a particular day. The number of vehicles passing through the crossing every alternate hour from 8 a.m. to 7 p.m. is shown in the bar graph. Time intervals are shown on x axis and number of vehicles are shown on y axis. One unit of length stands for 50 vehicles.



Answer the following questions:

1. Is it a horizontal or vertical bar graph?
2. Which time interval records minimum traffic?
3. Which time interval records maximum traffic?
4. What is the number of vehicles on road during the time interval when traffic is the maximum?
5. What is the number of vehicles on road during the time interval when traffic is the minimum?
6. Which time intervals record equal traffic?

Solution

1. We can see that it is a horizontal bar graph.
2. We can see that minimum traffic is shown by the shortest bar for the time interval 8-9 a.m.
3. We can see that maximum traffic is shown by the longest bar for the time interval 10-11 a.m.
4. Maximum traffic shown by the longest bar is 600 vehicles.
5. Minimum traffic shown by the shortest bar is 200 vehicles.
6. Time intervals 12-1 p.m. and 6-7 p.m. have equal traffic.

Do and Learn.

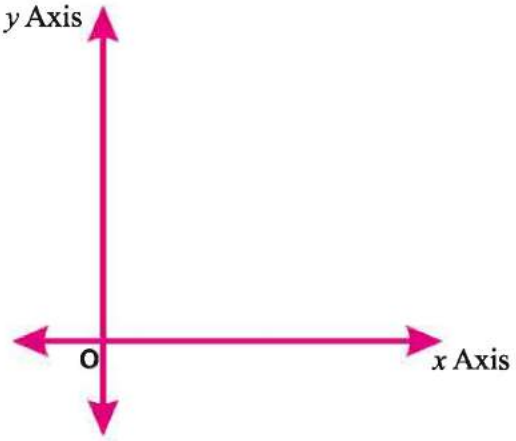
1. Represent the above bar graph by a pictograph.
2. Draw a bar graph taking time interval on y axis and number of vehicles on x axis.

In a model school, income from various paid facilities provided to townsfolk after school hours was presented in front of school management committee:

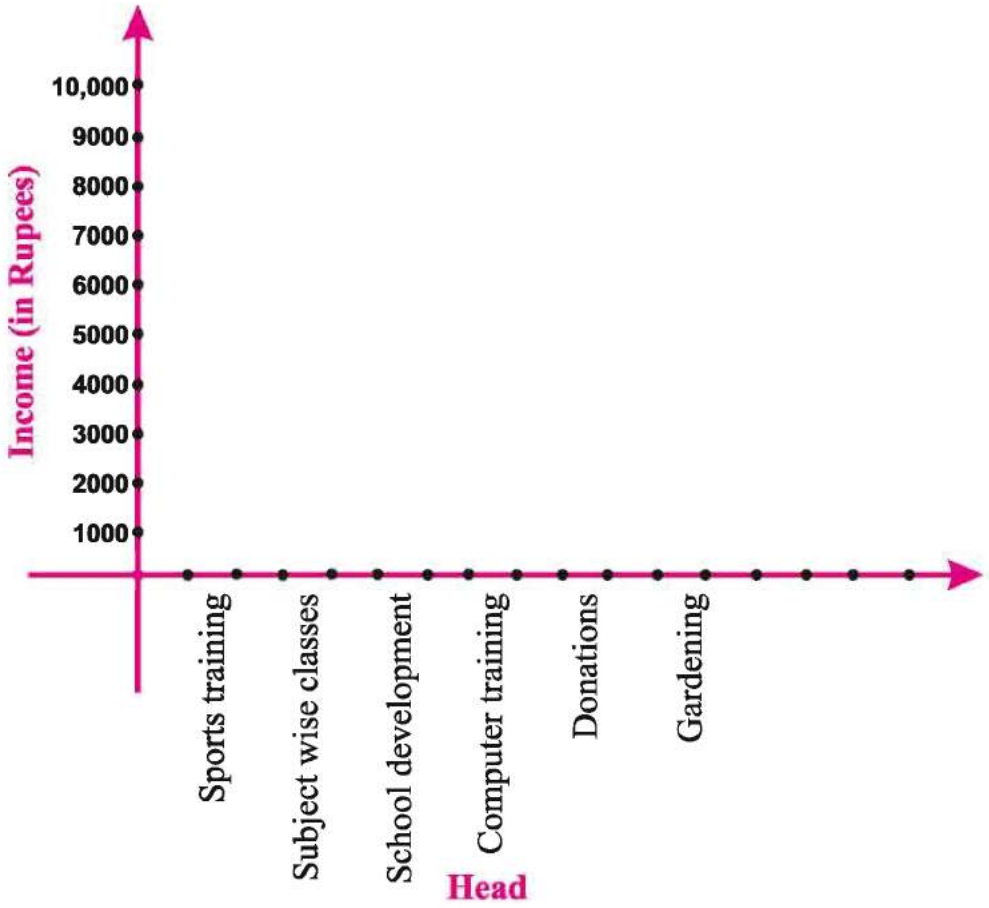
Paid Facility provided	Income (in Rupees)
Sports training	4,000
Subject wise classes	10,000
School development	3,000
Computer training	6,000
Donations	8,000
Gardening	7,000

School management committee appreciated the income and proposed to show it on the wall of headmaster's room in the form of a bar graph drawn on a chart. The bar graph was drawn in the following steps:

1. First of all, a horizontal line and a vertical line were drawn.



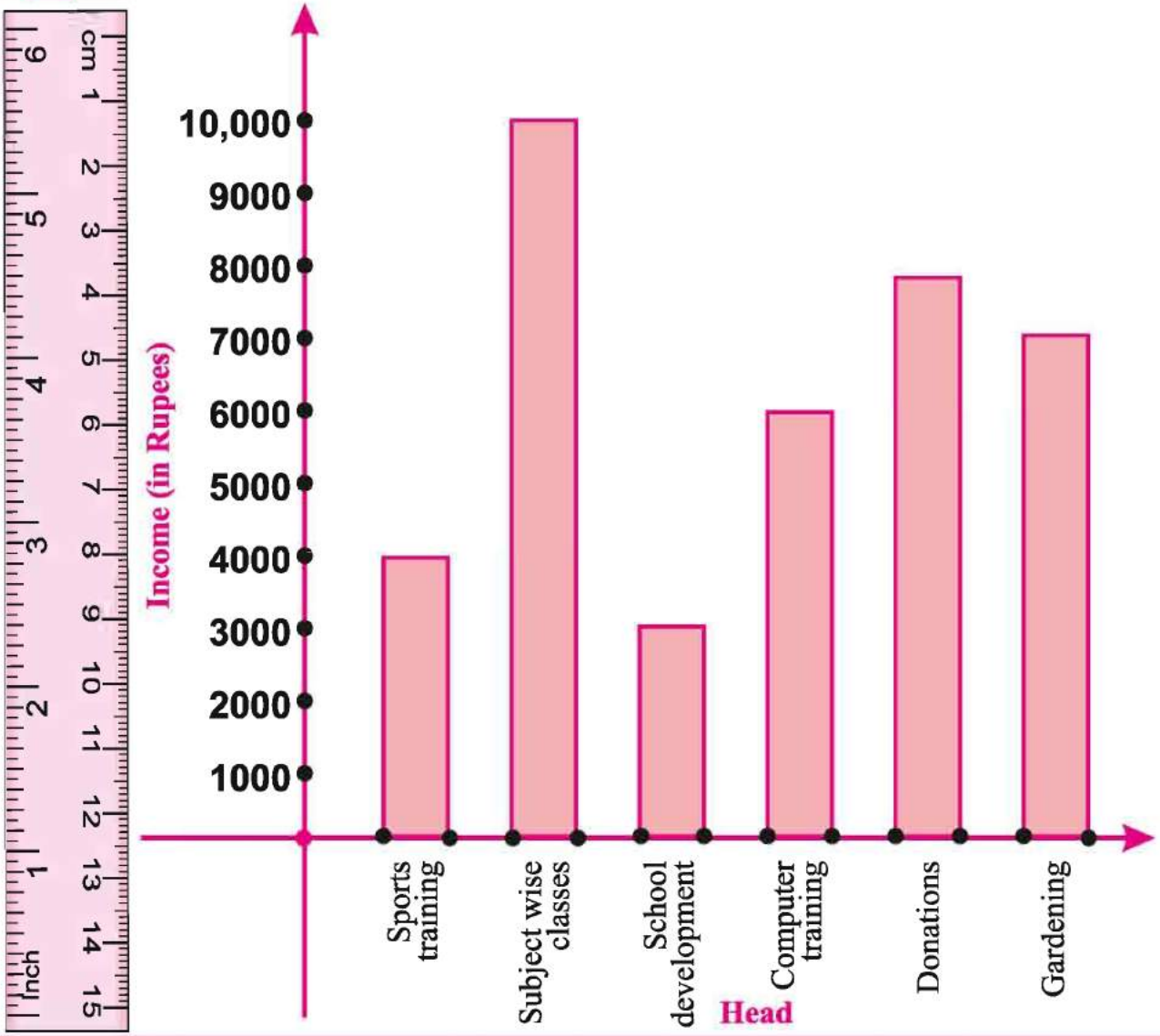
2. Along the horizontal line, Paid Facilities were marked. Along the vertical line, corresponding Income was marked. Bars of same width were taken keeping uniform gap between them.



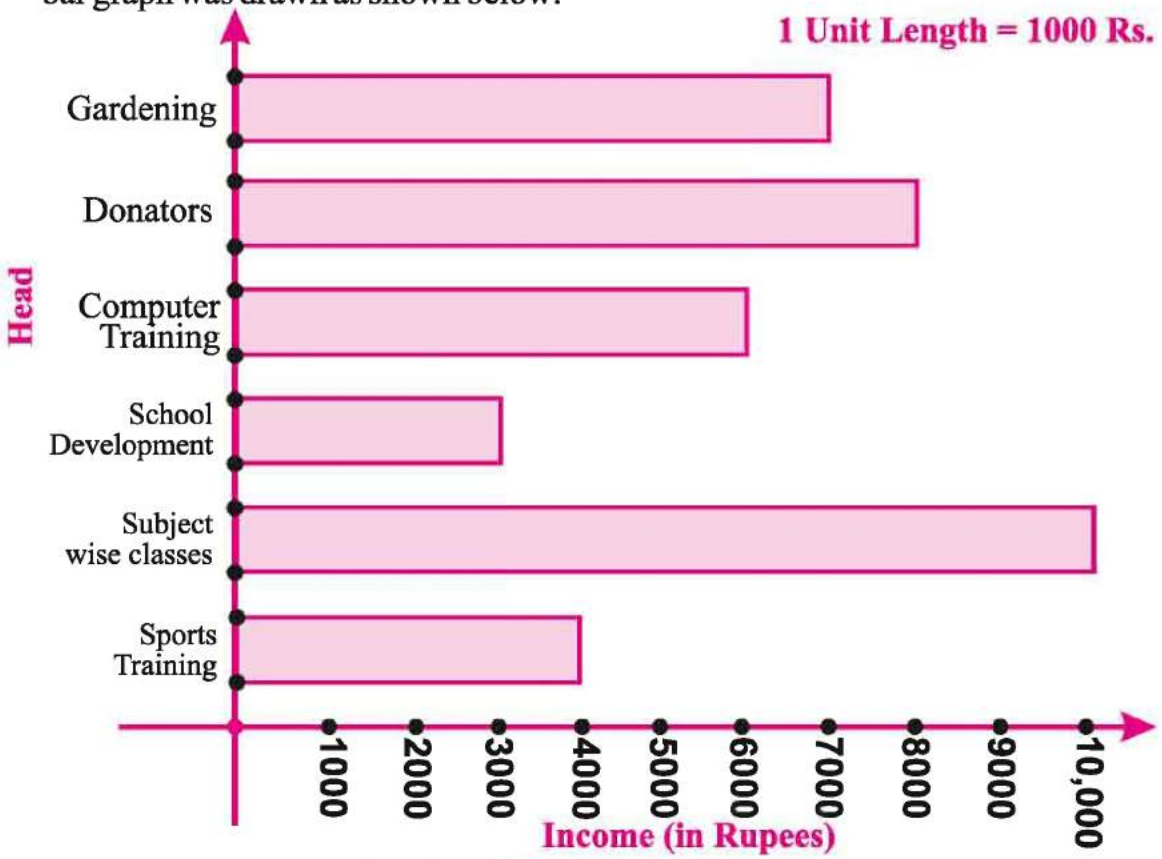
3. Suitable scale was chosen along the vertical line. Scale chosen: 1 unit length = Rs 1,000 and then the corresponding values were marked.

The heights of the bars were calculated for various facilities as shown below:

Sports training	:	4000 ÷ 1000	=	4 units
Subject wise classes	:	10000 ÷ 1000	=	10 units
School development	:	3000 ÷ 1000	=	3 units
Computer training	:	6000 ÷ 1000	=	6 units
Donations	:	8000 ÷ 1000	=	8 units
Gardening	:	7000 ÷ 1000	=	7 units



Seeing this bar graph, the headmaster suggested representing the data by interchanging positions of paid facilities and corresponding income. Then the bar graph was drawn as shown below:



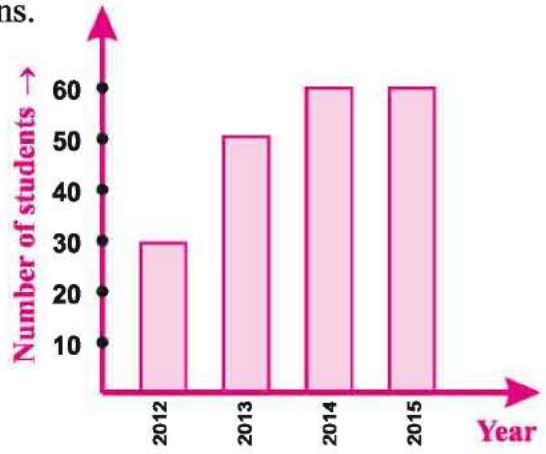
Exercise 15.3

1. The bar graph given alongside shows the number of students awarded scholarships during the years 2012-2015 in a particular school. Read the bar graph and write down your observations.

(i) What is the scale of this bar graph?

(ii) How many students were awarded scholarships in the year 2014?

(iii) In which year, minimum number of scholarships were awarded?



2. Given below is the data regarding average ages of some animals.

Elephant	70 years
Goat	15 years
Horse	50 years
Cow	22 years
Deer	40 years
Bull	28 years

Draw a bar graph to represent the above information and answer the following questions:

(i) Name the animal with highest average age.

(ii) Name the animal with least average age.

(iii) Find the difference between average ages of bull and cow.

3. Number of persons in various occupations in a colony is given in the following table.

Occupation	Teacher	Doctor	Shopkeeper	Daily Wager	Lawyer
Number of persons	22	8	19	26	10

To represent the above information, choose a scale of your choice and draw

(i) a vertical bar graph

(ii) a horizontal bar graph

4. Following table shows the yield of various crops in Harkhu's farm this year.

Name of the crop	Maize	Millet	Moth Bean	Guar	Soya bean
Yield (quantity in Kg)	12500	20600	13000	24000	18500

Take a scale of your choice and draw a horizontal bar graph to represent the above information and answer the following questions:

(i) Which crop has maximum yield and how much quantity?

(ii) What is the total yield?

(iii) Which crop yielded 20600 kg?

5. Following table shows the number of students who participated in various competitions in a camp:

Competition	Number of students participated
Drawing	34
Singing	12
Debate	18
Quiz	36

Take a scale of your choice and draw a horizontal bar graph and a vertical bar graph to represent the above information.

6. The following table shows marks obtained by 40 students in a Mathematics quiz competition:

Marks group	Number of students
0 – 20	3
20 – 40	6
40 – 60	12
60 – 80	14
80 – 100	5

Answer the following questions:

(i) Number of students who obtained marks in the group 40 – 60.
(ii) The marks group having maximum number of students?
(iii) Number of students who obtained more than 60 marks.

We Learnt

1. Data is a collection of numbers gathered to give some information.
2. There are two types of data: (i) primary data and (ii) secondary data.
3. To get a particular information from the given data quickly, the data can be arranged in a tabular form using tally marks
4. We learnt how a pictograph represents data in the form of pictures, objects or parts of objects. We have also seen how to interpret a pictograph and answer the related questions. We have drawn pictographs using symbols to represent a certain number of items or things. For example, = 5 students.
5. We have discussed how to represent data by using a bar diagram or a bar graph. In a bar graph, bars of uniform width are drawn horizontally or vertically with equal spacing between them. The length of each bar gives the required information.
6. To do this we also discussed the process of choosing a scale for the graph. For example, 1 unit = 100 bags. We have also practiced reading a given bar graph. We have seen how interpretations from the same can be made.