

4

Chapter

Data Handling

We'll cover the following key points:

- Introduction to Data Handling
- Representation of Data with Pictograph
- Drawing a Pictograph
- Bar Graphs
- Construction of Bar Graphs
- Aesthetic and Artistic Considerations

Do you Remember fundamental concept in previous class.

In class 5th we learnt

- Collection and Tabular Representation of Data
- Pictorial Representation of Data
- Bar graphs



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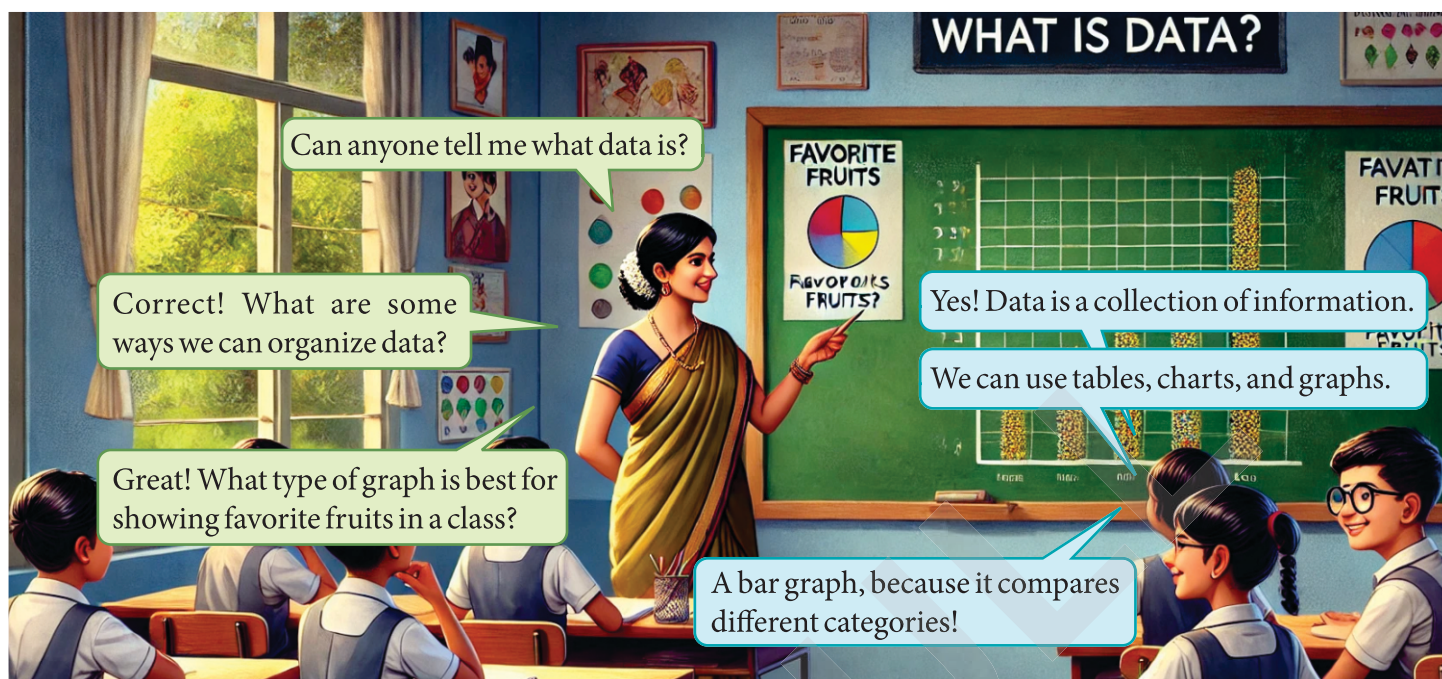
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Learning Outcomes

By the end of this chapter, students will be able to:

- Collect and organize data using various methods like tally marks and frequency tables.
- Represent data visually using bar graphs, line graphs, and pie charts.
- Interpret data presented in different graphical formats.
- Analyze and compare data to draw conclusions.
- Calculate measures of central tendency such as mean, median, and mode.
- Understand the concept of probability and basic data analysis.
- Solve real-world problems using data handling techniques.
- Present data effectively to communicate findings.
- Evaluate the reliability and accuracy of data sources to ensure sound conclusions.
- Identify trends and patterns to forecast future outcomes and support decision-making.
- Utilize digital tools and software to enhance data collection, analysis, and visualization.
- Communicate insights clearly through comprehensive reports and engaging presentations.

Introduction



Data handling is about taking care of data – collecting it, organizing it, cleaning it, and using it to make decisions or find solutions. Think of it like organizing a messy room, where each step makes the room cleaner and more useful.

Here are the main steps of data handling:

- 1. Collecting Data:** This is the first step where we gather information from different places, like surveys, websites, or sensors. The data can be numbers, text, or even pictures.
- 2. Cleaning Data:** Sometimes data isn't perfect. There may be mistakes or missing pieces. Cleaning data means fixing those issues, like deleting duplicate information or filling in missing values.
- 3. Organizing Data:** After cleaning, we organize the data in a way that makes sense and is easy to understand, like putting items in the right drawers.
- 4. Transforming Data:** Sometimes, data needs to be changed to be more useful. For example, you might want to turn a list of dates into a more readable format, or combine different pieces of information.
- 5. Storing Data:** Data needs to be stored safely so that it can be accessed later. This could be in a computer file, a database, or the cloud.
- 6. Analyzing Data:** This is where we look at the data closely to find patterns or answers. You might use tools like Excel or special software to do this.



7. **Making Decisions:** Finally, after analyzing the data, we use it to make smart decisions or predictions. This could be a business decision, a scientific discovery, or even a personal choice.

In short, data handling is about making sure the data you collect is clean, organized, and ready to help you solve problems or answer questions!

Collecting and Organizing Data

Collecting Data

Data collection is the first step in working with data. It's like gathering pieces of a puzzle that you will later put together. It's the process of gathering information from different places or sources. like: Surveys, Interviews, Websites/Online, Existing Databases.

Organizing Data

Once you've collected the data, you need to organize it so it's easy to understand and use. This step is like sorting your puzzle pieces before you start putting them together. Like: Categorizing, Creating Tables, Labeling, Sorting.

Example of Collecting and Organizing Data:

Let's say you're doing a survey to find out the favorite fruits of 10 people. Here's what the steps might look like:

- ✦ **Collecting:** You ask 10 people, "What's your favorite fruit?" and write down their answers.
- ✦ **Organizing:** Once you have the answers, you organize them in a table like this:

Person	Favorite Fruit
1	Apple
2	Banana
3	Apple
4	Orange
5	Banana
6	Orange
7	Apple
8	Mango
9	Mango
10	Orange

Fig. 4.1

Now, you have all the information in a neat and easy-to-read table. You can easily see that "Apple" and "Orange" are the most popular fruits.

Example : The following table shows the number of books read by students in a class during the month of December. The data is represented using tally marks.

Student	Number of Books
A	
B	
C	
D	
E	
F	
G	

Fig. 4.2

Tally Marks Legend:

- A group of 5 tally marks represents 5 books.
- A single tally mark represents 1 book.

Questions:

1. Who read the most books?
2. How many books were read by all the students together?

Step 1: Convert Tally Marks to Numbers

Let's first convert the tally marks into numbers for each student:

- ✦ **Student A:** $|||| || = 5 + 2 = 7$ books
- ✦ **Student B:** $|||| ||| = 5 + 5 + 1 = 11$ books
- ✦ **Student C:** $|||| ||| = 5 + 5 + 5 = 15$ books
- ✦ **Student D:** $|||| || = 5 + 5 = 10$ books
- ✦ **Student E:** $|||| ||| = 5 + 5 + 3 = 13$ books
- ✦ **Student F:** $|||| || = 5 + 5 = 10$ books
- ✦ **Student G:** $|||| ||| = 5 + 5 + 5 = 15$ books

The table created in this manner is referred to as a frequency distribution table, and the count of tally marks in each row represents the frequency, which indicates the number of occurrences or students in that category. This organization of data makes it more structured, facilitating easier in.

Now, let us define some key terms related to the above discussion:

Observation: An observation is the item or entity that is being observed or recorded in the data. In the above example, Apple, Mango, Banana, and Orange are the observations.

Frequency: The frequency of an observation refers to how many times that observation appears in the given data.

Frequency Distribution Table: A frequency distribution table is a table that displays the frequency of each observation, summarizing how often each item or observation occurs in the dataset.

Example : Here's a table showing the number of fruits sold by a fruit vendor over the course of a week.

Day	Apples	Bananas	Oranges	Mangoes
Monday	20	15	30	10
Tuesday	25	20	25	12
Wednesday	18	22	28	14
Thursday	30	18	35	15
Friday	28	19	40	20

Fig. 4.3

Question 1: What is the total number of apples sold throughout the week?

Question 2: On which day were the most bananas sold?

Question 3: How many more oranges were sold on Friday than on Monday?

Question 4: What is the total number of fruits sold on Thursday?

Question 5: What is the average number of mangoes sold per day over the week?

Solution:1 To find the total number of apples sold, add the apples sold each day:

- Monday: 20
- Tuesday: 25
- Wednesday: 18
- Thursday: 30
- Friday: 28

Total apples sold = $20 + 25 + 18 + 30 + 28 = 121$ apples

Solution:2 The number of bananas sold each day:

- Monday: 15
- Tuesday: 20
- Wednesday: 22
- Thursday: 18
- Friday: 19

The maximum number of bananas were sold on Wednesday (22 bananas).

Solution:3

- Oranges sold on Friday: 40
- Oranges sold on Monday: 30

The difference = $40 - 30 = 10$ more oranges were sold on Friday than on Monday.

Solution:4 To find the total fruits sold on Thursday, add the fruits sold:

- Apples: 30
- Bananas: 18
- Oranges: 35
- Mangoes: 15

Total fruits sold on Thursday = $30 + 18 + 35 + 15 = 98$ fruits

Solution:5 To find the average number of mangoes sold, first find the total number of mangoes sold throughout the week:

- Monday: 10
- Tuesday: 12
- Wednesday: 14
- Thursday: 15
- Friday: 20

Total mangoes sold = $10 + 12 + 14 + 15 + 20 = 71$ mangoes

Now, divide by the number of days (5): Average mangoes sold per day = $71 \div 5 = 14.2$ mangoes per day.



Activity Time

We know a die is a cube where 6 faces are marked with numbers or dots from 1 to 6, one number on each face. Recall, we use a die while playing Ludo or Snake and ladder.

Throw a die 18 times and write the result of each throw in the following table:

Scores	No. of Observation (Tally marks)	Frequency
1		
2		
3		
4		
5		
6		
Total		

On the basis of this data, can you answer the following questions:

- How many times 6 has occurred?
- How many times more than 3 has been obtained?
- How many times less than 4 has been obtained?
- Are there any numbers which occurred same number of times



Exercise 4.1

1. The ice cream flavors preferred by 30 students were recorded as follows:

Vanilla, Chocolate, Strawberry, Vanilla, Mango, Chocolate, Strawberry, Vanilla, Chocolate, Mango, Vanilla, Chocolate, Mango, Strawberry, Vanilla, Chocolate, Mango, Vanilla, Mango, Chocolate, Vanilla, Strawberry, Chocolate, Mango, Vanilla, Chocolate, Mango, Vanilla, Chocolate, Vanilla

Questions:

- (a) Arrange the data in a table using tally marks.
(b) How many students prefer Mango?

2. The favorite sports of 22 students were recorded as:

Football, Basketball, Cricket, Football, Tennis, Basketball, Cricket, Football, Tennis, Basketball, Cricket, Football, Tennis, Basketball, Cricket, Football, Basketball, Tennis, Football, Cricket, Tennis, Football

Questions:

- (a) Represent the data using tally marks in a table. (b) How many students prefer Football?

3. The types of books read by 18 students are recorded as:

Fiction, Non-fiction, Science, Fiction, Fiction, Non-fiction, Science, Fiction, Science, Non-fiction, Fiction, Science, Non-fiction, Fiction, Non-fiction, Fiction, Science, Non-fiction

Questions:

- (a) Create a tally table for the data. (b) How many students read Fiction books?

4. The following data represents the number of goals scored by a group of 30 students in a football match:

5, 3, 7, 2, 3, 6, 4, 7, 5, 6, 4, 7, 8, 6, 5, 4, 3, 5, 6, 2, 7, 8, 6, 3, 4, 5, 2, 6, 7, 4

- (a) Prepare a frequency distribution table for the given data.
(b) What is the total number of goals scored by all students?

5. The data below represents the ages of a group of people:

Age (in years):	18 — 25	26 — 35	36 — 45	46 — 55	56 — 65
Frequency :	10	15	12	8	5

- (a) How many people are aged between 26 and 45 years?
(b) How many people are aged 35 years or younger?

6. The following table shows the number of vehicles passing through a toll booth during different hours of the day:

Time of Day (Hour)	Frequency (Number of Vehicles)
6 AM — 7 AM	50
7 AM — 8 AM	75
8 AM — 9 AM	120
9 AM — 10 AM	90
10 AM — 11 AM	60

- (a) What is the total number of vehicles passing through the toll booth from 6 AM to 10 AM?
- (b) How many vehicles passed through between 7 AM and 9 AM?
7. A survey was conducted to find out the favorite colors of 30 students. The responses were as follows:

Red, Blue, Green, Red, Yellow, Blue, Green, Red, Green, Yellow, Blue, Green, Red, Yellow, Blue, Green, Red, Yellow, Blue, Red, Green, Yellow, Red, Blue, Green, Yellow, Red, Blue, Green, Yellow.

Questions:

- (a) Arrange the data in a table using tally marks.
- (b) How many students prefer the color Green?
8. The following data represents the number of books read by a group of 25 students:
- 3, 7, 2, 5, 6, 3, 4, 7, 8, 5, 6, 3, 7, 4, 5, 8, 2, 6, 3, 5, 4, 7, 6, 3, 4
- (a) What is the total number of books read by all students?
- (b) How many students read more than 5 books?
9. The following data shows the number of hours spent studying by a group of 40 students in a week:
- 1, 3, 5, 2, 4, 3, 6, 2, 3, 4, 5, 1, 6, 2, 3, 4, 5, 3, 6, 4, 2, 5, 1, 6, 2, 4, 5, 3, 6, 4, 5, 1, 3, 6, 2, 4, 3, 5, 2, 6
- (a) What is the total number of hours spent by all students?
- (b) How many students spent more than 3 hours studying?

Representation of Data with Pictograph

A pictograph is a way to represent data using pictures or symbols to depict quantities. Each symbol or picture represents a certain number of items, making it easier to visualize the data.

Steps to Create a Pictograph:

1. **Choose a symbol:** Each symbol should represent a specific quantity (e.g., 1 symbol = 5 items).
2. **Organize data:** Prepare the data in a table or list with categories and corresponding quantities.
3. **Draw the pictograph:** Use the chosen symbol to represent the data. If the number isn't a whole multiple of the chosen quantity, you can use a **fraction** or a **scaled symbol** (like half or quarter symbols) to represent the remaining quantity.
4. **Label the graph:** Include the title of the pictograph and a key to indicate what each symbol represents.

The following pictograph represents the number of books read by five students during a month.

Each book is represented by the symbol 

Pictograph:

Books Read by Students:



Fig. 4.4



- A. How many books did each student read?
- B. Which student read the most books?
- C. How many books did all students read together?

After observing above picture, we can easily answer the following questions:

- i. Which student, most number of books were read?
- ii. Which student, least number of books were read?
- iii. What is the total number of books read in that week?

Such a representation is called pictograph

Example : The following pictograph represents the number of books read by five students during

a month. Each book is represented by the symbol 

Books Read by Students:



Fig. 4.5

- A. How many books did each student read?
- B. Which student read the most books?
- C. How many books did all students read together?

Solution :

- i. Number of books read by each student:
 - ✧ Student A: 4 books
 - ✧ Student B: 3 books
 - ✧ Student C: 5 books
 - ✧ Student D: 2 books
 - ✧ Student E: 6 books
- ii. Student E read the most books (6 books).
- iii. Total number of books read = 4 + 3 + 5 + 2 + 6 = 20 books.

Example : The following pictograph represents the number of students who participated in different sports in a school. Each symbol  represents 5 students.

Sports Participation:

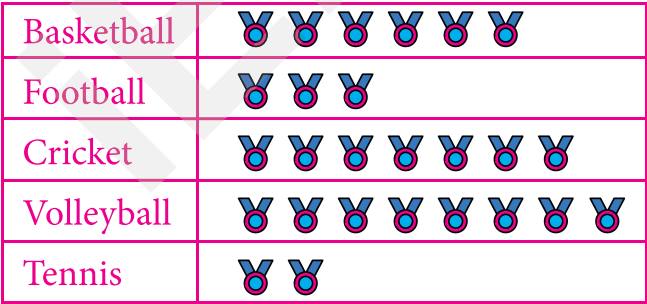


Fig. 4.6

- i. How many students participated in each sport?
- ii. Which sport had the highest participation?
- iii. What is the total number of students who participated in the sports?
- iv. How many more students participated in Volleyball than Football?

Solution :

i. Number of students who participated in each sport:

✧ **Basketball:** 30 students (6 )

✧ **Football:** 15 students (3 )

✧ **Cricket:** 35 students (7 )

✧ **Volleyball:** 40 students (8 )

✧ **Tennis:** 10 students (2 )

ii. The sport with the highest participation is **Volleyball** (40 students).

iii. Total number of students who participated in the sports:

$$30(\text{Basketball}) + 15(\text{Football}) + 35(\text{Cricket}) + 40(\text{Volleyball}) + 10(\text{Tennis}) = 130$$

Total students = 130.

iv. The number of students who participated in Volleyball is 40, and in Football is 15. The difference is:

$$40 - 15 = 25$$

25 more students participated in Volleyball than Football.

Drawing a Pictograph

Steps to Create a Pictograph

1. Collect Data

Example:

✧ Apples: 20

✧ Bananas: 15

✧ Grapes: 10

✧ Oranges: 25

2. Choose a Symbol

Select a symbol that fits the data, such as  for fruits.

3. Decide the Scale

✦ Keep the scale simple, like 1  = 5 fruits.

✦ If the data isn't a multiple of the scale, use partial symbols (e.g., half an  = 2.5 fruits).

4. Draw the Pictograph

Create a table with two columns:

➤ Column 1: Categories (Apples, Bananas, etc.).

➤ Column 2: Pictorial representation  symbols).

5. Add a Key and Title

- ✦ Title: "Fruit Collection Data".
- ✦ Key:  = 5 fruits.

Pictograph Example





Fruit	Pictograph
Apples	
Bananas	
Grapes	
Oranges	

Fig. 4.7



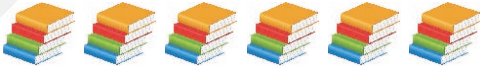


Explanation:


- ✦ **Apples:** 20 fruits \rightarrow 4 symbols ($20 \div 5 = 4$).
- ✦ **Bananas:** 15 fruits \rightarrow 3 symbols ($15 \div 5 = 3$).
- ✦ **Grapes:** 10 fruits \rightarrow 2 symbols ($10 \div 5 = 2$).
- ✦ **Oranges:** 25 fruits \rightarrow 5 symbols ($25 \div 5 = 5$).



Exercise 4.2






1. Pictograph: Favorite Subjects of Students in a School

Subject	Pictograph
Mathematics	
Science	
English	
History	
Geography	






Key:  = 5 Students

- How many students prefer Mathematics?
- How many more students prefer Science than English?
- What is the total number of students who prefer History and Geography combined?

2. The pictograph below shows the number of sports equipment sold in a month. Each picture represents 10 items sold.

Sport	Equipment Sold
Football	
Basketball	
Tennis	
Cricket	
Badminton	

- How many footballs were sold?
 - How many more basketballs were sold than tennis rackets?
 - Which sport had the highest sales, and how many items were sold?
 - What is the total number of cricket and badminton equipment sold combined?
 - If each piece of sports equipment costs ₹5, how much total money did the seller make from selling football and basketball equipment?
3. The following pictograph shows the number of books sold by a bookstore in one week. Each picture represents 10 books sold.

Genre	Books Sold
Fiction	
Non-Fiction	
Mystery	
Science Fiction	
Biography	

- How many fiction books were sold?
- How many more science fiction books were sold than mystery books?
- What is the total number of non-fiction and biography books sold combined?
- Which genre sold the least number of books, and how many books were sold?
- If each book costs ₹12, how much total money did the bookstore make from selling all mystery and biography books?

Bar Graphs

A bar graph is a visual representation of data using rectangular bars. Each bar represents a category or a specific value, and the length or height of the bar corresponds to the value it represents. The bars can be arranged vertically or horizontally, and the data is usually represented on two axes:

1. **The X-axis (horizontal axis)** shows the different categories or items.
2. **The Y-axis (vertical axis)** shows the values or quantities related to each category.

Example

Imagine you're studying the number of books read by students in a class. Here's how a bar graph would work:

- ✦ **X-axis:** Names of students (e.g., Alice, Bob, Charlie, etc.)
- ✦ **Y-axis:** Number of books read (e.g., 1 to 10 books)

Each student's name would have a bar above it, and the height of the bar would represent the number of books they read. This makes it easy to compare the number of books read by each student at a glance.

Bar graphs help in comparing data across different categories and are commonly used in both educational and professional settings.

Properties of Bar Graphs

Bar graphs have several important properties that make them useful for representing data. These properties help in interpreting the data clearly and effectively. Here are the key properties of bar graphs:

1. Bars:

- ✦ Bars in a bar graph are rectangular in shape and represent data.
- ✦ The length or height of each bar represents the quantity or value of the category it is associated with.

2. Axes:

- ✦ A bar graph has two axes: the X-axis (horizontal) and the Y-axis (vertical).
- ✦ The X-axis usually represents categories or items (e.g., months, students, products).
- ✦ The Y-axis represents the numerical values or quantities corresponding to each category.

3. Scale:

- ✦ The Y-axis has a scale, which helps to measure the data accurately. The scale should be consistent and well-labeled so that the height or length of the bars can be easily interpreted.



4. Spacing Between Bars:

- ✦ Bars are usually spaced evenly apart to make the graph neat and easy to read.
- ✦ In some cases, bars may touch each other, depending on the type of bar graph (e.g., histograms).

5. Labels:

- ✦ Both axes should have clear labels to show what they represent (e.g., names, time periods, quantities).
- ✦ Each bar should also have a label or value at the top to indicate its exact value.

6. Orientation:

- ✦ Bar graphs can be either vertical or horizontal. In vertical bar graphs, the bars extend upwards from the X-axis, while in horizontal bar graphs, the bars extend from the Y-axis to the right.

7. Title:

- ✦ Every bar graph should have a title to describe the data being represented. It should be clear and specific so that the viewer understands the context.

8. Comparing Data:

- ✦ One of the key properties of a bar graph is that it allows for easy comparison of data between different categories or groups. By observing the height or length of the bars, it is easy to see which category has more or less of the represented quantity.

Example : The bar graph below shows the number of books read by five students in a class.

Student	Aarav	Priya	Sameer	Ananya	Rohan
Books Read	10	7	12	5	8

Fig. 4.8

Question 1: How many books did Sameer read?

Solution: Sameer read 12 books.

Question 2: Which student read the fewest books, and how many did they read?

Solution: Ananya read the fewest books, 5 books.

Question 3: What is the total number of books read by all five students?

Solution:

Total books = $10 + 7 + 12 + 5 + 8 = 42$ books.

Example : In a survey of 50 people, the amount of time spent on various activities per day (in hours) was recorded. The data is represented by the following bar graph:

- **Sleep:** 8 hours (40 people)

- **Work:** 6 hours (30 people)
- **Exercise:** 1 hour (25 people)
- **Leisure:** 2 hours (45 people)
- **Study:** 3 hours (20 people)

Points to Remember

- **Title** – Describes what the graph is about.
- **X-axis** (Horizontal Line) – Represents the categories or groups.
- **Y-axis** (Vertical Line) – Represents the values (numbers).
- **Bars** – The height/length of each bar represents the quantity.
- **Scale** – A fixed interval used to measure the height of bars.

Questions:

1. What information does the bar graph provide?
 2. How many people spend 3 hours on studying?
 3. Which activity is done the most, and how many people do it?
 4. Which activity requires the least amount of time, and how much time is spent on it?
1. **Answer:** The bar graph shows the number of people in a survey of 50 individuals and the average number of hours they spend on various daily activities.
 2. **Answer:** According to the bar graph, 20 people spend 3 hours on studying.
 3. **Answer:** The most common activity is Leisure, done by 45 people.
 4. **Answer:** The activity that requires the least amount of time is Exercise, with 1 hour spent by 25 people.

Construction of Bar Graphs

Constructing a bar graph involves several steps to visually represent data. Below is a step-by-step guide on how to construct a bar graph:

Steps for Constructing a Bar Graph:

1. Collect the Data

Before constructing the bar graph, you need to have data that you want to represent. The data is typically in the form of categories and corresponding numerical values.

Example : Let's say we have the following data showing the number of books read by five students in a month.

Student	Books Read
Aarav	10
Priya	7
Sameer	12
Ananya	5
Rohan	8

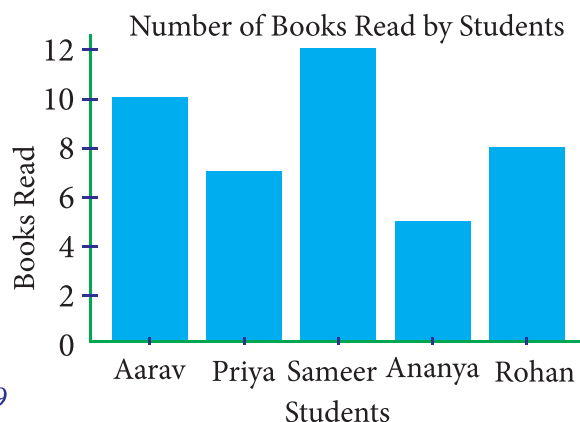


Fig. 4.9

2. Draw Two Axes

X-axis (Horizontal axis): This axis will represent the categories. In this case, it will be the names of the students.

Y-axis (Vertical axis): This axis will represent the values. In this case, it will represent the number of books read.

Make sure the axes are drawn at **right angles** to each other.

3. Label the Axes

X-axis: Label it with the categories you want to display (e.g., Aarav, Priya, Sameer, Ananya, Rohan).

Y-axis: Label it with the range of values (e.g., 0, 5, 10, 15, 20 for the number of books). Be sure the values on the Y-axis are equally spaced.

4. Scale the Y-axis

The Y-axis should have an appropriate scale that allows for easy comparison of values. Make sure the scale is consistent (e.g., intervals of 1, 5, or 10). In our example, we can use intervals of 5.

5. Draw the Bars

For each category on the X-axis (e.g., each student), draw a vertical or horizontal bar. The height or length of the bar should correspond to the value on the Y-axis.

For example:

- ✦ For Aarav, the bar will reach up to 10 on the Y-axis.
- ✦ For Priya, the bar will reach up to 7 on the Y-axis.
- ✦ Continue this for all students.

The bars should be equally spaced apart and of the same width for consistency.

6. Label the Bars (Optional)

You can add the value of each bar on top of the bar to make it easier to understand the exact number represented by each bar.

7. Title the Graph

Give the bar graph a meaningful title that describes what the graph is about. For example, "Number of Books Read by Students."

Construction of Bar Graphs

Examples: The marks obtained by Ravi in his annual examination are shown below:

Subjects	Hindi	English	Mathematics	Science	Social Studies
Marks obtained	60	80	90	70	55

Draw a bar graph to represent the above data. *Fig. 4.10*

Solution: We can draw the bar graph by following steps:

- On a graph paper, draw a horizontal line **OX** and vertical line **OY**.
- Along horizontal line, write the names of the subjects at points taken at uniform gaps.
- Choose the scale 1 unit length = 10 marks.
- On the horizontal line, draw bars of equal width and of heights obtained in step (iv) at the points marked in step (ii).
- Then, the heights of the various bars are: Hindi = 60; English = 80, Mathematics = 90; Science = 70; and Social Studies = 55.

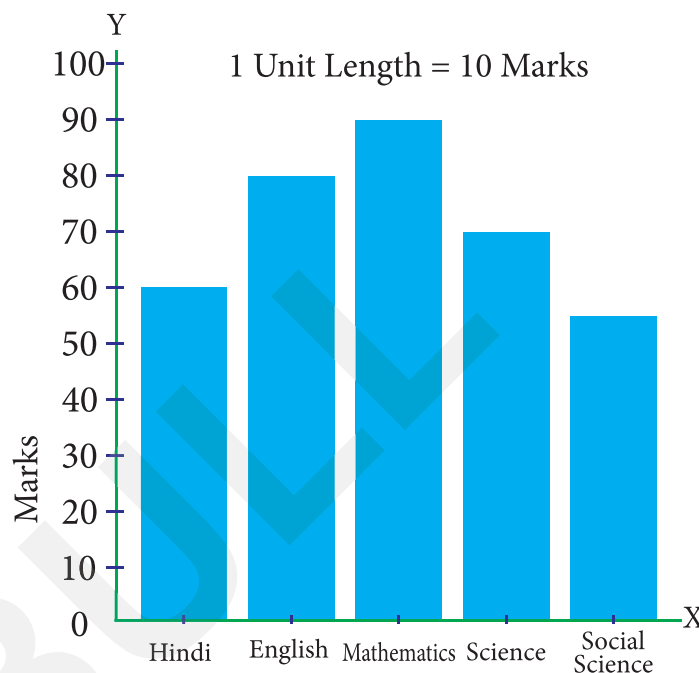


Fig. 4.11

Aesthetic and Artistic Considerations

Aesthetic and artistic considerations in mathematics involve using visual tools, design, color, patterns, and hands-on activities to bring mathematical concepts to life. This approach helps to make learning more enjoyable and accessible by appealing to students' creativity while enhancing their conceptual understanding. Whether it's through geometry, patterns, or graphs, the intersection of art and math creates a space for students to see the subject in a new light—one that is not just about solving problems but also about appreciating the harmony and structure that math offers.

In this context, students can engage with mathematical concepts in a more holistic way, connecting math to everyday life, nature, art, and even culture. This approach sparks curiosity, fosters creativity, and builds a positive attitude toward learning mathematics, all while promoting critical thinking and problem-solving skills.

Infographics

Infographics in mathematics are a fun and engaging way to represent math concepts visually. They use pictures, charts, graphs, and other visual elements to help students understand and remember mathematical ideas more easily. Infographics can help students better grasp important concepts like numbers, shapes, measurements, data, and more.

Why Use Infographics in Mathematics?

- 1. Visual Learning:** Many students find it easier to understand math when it's shown visually. Infographics turn abstract ideas into concrete, easy-to-see examples.
- 2. Engagement:** Infographics are colorful, fun, and visually appealing, which makes learning math more exciting.
- 3. Memory:** Visual representations help students remember concepts better because they are easier to recall than just numbers or text.
- 4. Simplification:** Infographics break down complex math ideas into simpler, digestible parts, making math less intimidating for students.



Exercise 4.3

1. Bar Graph Data: Favorite Sports of Students

Sport	Football	Basketball	Cricket	Tennis	Volleyball
Number of Students	25	18	15	10	8

Questions:

- What is the total number of students who participated in the survey?
 - How many students prefer Basketball?
 - What are the different sports liked by the students?
 - Which sport is preferred by the most number of students?
 - Which sport is preferred by the least number of students?
2. The bar graph below shows the number of books read by five students during their summer holidays:

Number of Books Read by Students

Student Name	Aarav	Priya	Vijay	Meera	Rohan
Number of Books	14	9	11	16	7

Answer the following questions based on the bar graph:

- Which student read the least number of books?
- How many more books did Meera read than Priya?
- Which two students together read 30 books?
- What is the difference in the number of books read by Vijay and Rohan?
- If Priya had read 3 more books, how many books would she have read?

3. The bar graph below shows the number of fruits collected by five students during a school activity:

Number of Fruits Collected by Students

Student Name	Aarav	Priya	Vijay	Meera	Rohan
Number of Fruits	20	15	18	25	12

Answer the following questions based on the bar graph:

- (a) Who collected the second-highest number of fruits?
- (d) What is the total number of fruits collected by Aarav and Rohan?
- (c) How many fewer fruits did Priya collect than Meera?
- (d) Which student collected the average number of fruits, closest to the mean of all fruits collected?
- (e) If Meera gave away 5 fruits to Rohan, how many fruits would each of them have then?
4. **Bar Graph Data: Weekly Screen Time of Students (in Hours)**

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Screen Time (Hrs)	4	5	6	3	7	8	6

Answer the following questions based on the bar graph:

- (a) What is the total screen time for the entire week?
- (b) Which day had the maximum screen time?
- (c) Which day had the minimum screen time?
- (d) What is the average screen time per day?
- (e) How many days had screen time of more than 5 hours?



1. Tick (✓) the correct answer:

a. The mode of the data set {4, 7, 4, 9, 4, 6} is:

- (i) 6 ☐ (ii) 7 ☐ (iii) 4 ☐ (iv) 9 ☐

b. The graphical representation of data using bars of uniform width is called:

- (i) Bar graph ☐ (ii) Pie chart ☐ (iii) Histogram ☐ (iv) Line graph ☐

c. The mean of the data set {5, 10, 15} is:

- (i) 15 ☐ (ii) 10 ☐ (iii) 5 ☐ (iv) 20 ☐

d. A tally mark is used to:

(i) Add numbers

☐

(ii) Count frequencies

☐

(iii) Divide numbers

☐

(iv) Subtract values

☐

e. Which of these is not a part of data handling?

(i) Organizing data

☐

(ii) Collecting data

☐

(iii) Calculating perimeter

☐

(iv) Presenting data

☐

2. Provide the missing information in the blanks:

a. The sum of all observations divided by the number of observations is called the _____.

b. The difference between the highest and lowest values in a data set is called the _____.

c. A _____ chart is used to represent data as parts of a whole.

d. In a bar graph, the length of the bar represents the _____ of the data.

e. The mode of a data set is the value that occurs _____.

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3. A fruit seller records the sales of apples for 5 days: {20, 30, 25, 35, 40}. Calculate:

a) The average sales. b) The range of sales. c) The median sales.

4. A fruit seller records the number of apples sold each day for a week: {40, 45, 50, 55, 48, 60, 45}.

a) The average sales. b) The range of sales. c) The median sales.

Assertion and Reason

Experiential Learning

Each question has two statements, Assertion (A) and Reason (R). Choose the correct option:

A: Both A and R are true, and R is the correct explanation of A.

B: Both A and R are true, but R is not the correct explanation of A.

C: A is true, but R is false.

D: A is false, but R is true.

1. **Assertion (A):** A bar graph is used to represent categorical data.

Reason (R): Bar graphs display data using horizontal or vertical bars.

2. **Assertion (A):** The mean is always one of the values in the data set.

Reason (R): The mean is calculated by adding all values and dividing by the total number of values.

3. **Assertion (A):** A pie chart is best used to show parts of a whole.

Reason (R): A pie chart uses circular sections to represent proportions.

4. Assertion (A): The range of a data set is equal to the sum of all its values.

Reason (R): The range is the difference between the maximum and minimum values in the data set.

5. Assertion (A): The mode is the best measure of central tendency when data has many repeated values.

Reason (R): The mode identifies the most frequently occurring value in the data set.

HOTS (Higher Order Thinking Skills)

Critical Thinking

1. A survey was conducted to find the favorite colors of students in a class, and the data was represented as: {Red: 12, Blue: 10, Green: 8, Yellow: 15}. Draw a bar graph to represent this data.
2. A bus driver records the number of passengers traveling each day for 7 days: {50, 55, 60, 70, 65, 60, 50}. What is the average number of passengers? Explain if the mean or mode is more useful for analysis.

Case Study

Critical Thinking

A student conducted a survey to find the favorite sports of classmates. The data is presented in the table below:

Sports	Number of Students
Cricket	15
Football	10
Basketball	8
Badminton	12
Tennis	5

Questions:

1. Which sport is the most popular?
2. What percentage of the students chose badminton?
3. If 10 more students vote for football, how will the data change?
4. Draw a bar graph to represent this data.
5. Find the ratio of students who chose cricket to those who chose tennis.