

CHAPTER 4

DATA HANDLING AND PRESENTATION

Complete Notes + Solutions

What is Data?

Data is any collection of facts, numbers, measures, observations or other descriptions of things that convey information about those things.

Examples of Data:

- Favourite colours of your classmates
- Weight of each student in the class
- Number of books read per month
- Scores in a cricket match

We live in an AGE OF INFORMATION. Learning to collect, organise, display, and interpret data is a very important skill!

4.1 Collecting and Organising Data

Navya and Naresh were discussing their favourite games. Navya thought cricket was most popular, but Naresh liked hockey. To find out the truth, they surveyed all classmates!

The Raw Data (Unorganised List):

Student	Favourite Game	Student	Favourite Game	Student	Favourite Game
Mehnoor	Kabaddi	Pushkal	Satoliya	Anaya	Kabaddi
Jubimon	Hockey	Densy	Badminton	Jivisha	Satoliya
Simran	Kabaddi	Jivika	Satoliya	Rajesh	Football
Nand	Satoliya	Leela	Hockey	Thara	Football
Ankita	Kabaddi	Afshan	Hockey	Soumya	Cricket
Imon	Hockey	Keerat	Cricket	Navjot	Hockey
Yuvraj	Cricket	Gurpreet	Hockey	Hemal	Satoliya
Rehana	Hockey	Arsh	Kabaddi	Debabrata	Football
Aarna	Badminton	Bhavya	Cricket	Ananya	Hockey
Kompal	Football	Sarah	Kabaddi	Hardik	Cricket
Tahira	Cricket				

Problem: Looking at this list, it is hard to quickly find the most popular game!

Solution: ORGANISE the data into a tally table to count frequencies.

Organised Data — Tally Table:

Game	Tally Marks	Frequency (Count)
Cricket	I	6
Hockey		8
Kabaddi	I	6
Satoliya (Pittu)	I	5
Football		4
Badminton		2

Answer: Hockey is the most popular game with a frequency of 8 students.

Figure It Out — Section 4.1

Q1. What would you do to find the most popular game among Naresh's and Navya's classmates?

To find the most popular game, we organise the data into a frequency table:

Step 1: List all the games in one column.

Step 2: Go through each entry in the raw data list.

Step 3: Put a tally mark (|) for each student under their chosen game. After 4 marks, put a cross line (||||) to make groups of 5.

Step 4: Count all tally marks to get the frequency.

Step 5: The game with the highest frequency is the most popular.

Ans: Arrange the data in a frequency table using tally marks to count each game.

Q2. What is the most popular game in their class?

From our tally table above:

Hockey = 8 students (highest frequency)

Ans: HOCKEY is the most popular game with 8 students choosing it.

Q4. Put a tick for questions needing data collection; cross for those that don't:

Question	Needs Data Collection?	Reason
a. Most popular TV show among classmates?	TICK (✓)	This varies from class to class — must survey

b. When did India get independence?	CROSS (X)	Known historical fact — 15 August 1947
c. How much water is wasted in her locality?	TICK (✓)	This is local/specific — must measure/observe
d. What is the capital of India?	CROSS (X)	Known fact — New Delhi

Tally Marks and Frequency Tables

How Tally Marks Work

Tally marks are used to count quickly without losing track.

| = 1 || = 2 ||| = 3 |||| = 4 |||| (crossed) = 5

When count reaches 5, draw a DIAGONAL LINE through the previous 4 marks. This makes it easy to count in groups of 5.

FREQUENCY = the number of times a particular value occurs in data.

Example: Shri Nilesh's Sweet Preference Table

Shri Nilesh collected sweet preferences from his students to buy sweets for new year.

Sweet	Tally Marks	No. of Students
Jalebi		6
Gulab Jamun		9
Gujiya		13
Barfi		3
Rasgulla		7

Figure It Out — Sweets Table

Q1. Complete the table and answer:

Reading the tally marks carefully:

Question	Tally Marks	Count	Answer
a. Students chose Jalebi?		5 + 1	6 students
b. Barfi was chosen by?		3	3 students
c. Students chose Gujiya?		5+5+3	13 students
d. Rasgulla was chosen by?		5 + 2	7 students

e. Students chose Gulab Jamun?		5 + 4	9 students
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Ans: Jalebi=6, Gulab Jamun=9, Gujiya=13, Barfi=3, Rasgulla=7. Total students = 38.

Q2. Is the table sufficient to distribute sweets to the correct student?

NO — the table only shows HOW MANY students chose each sweet, but NOT which specific student chose which sweet.

Alternative: Keep a record linking each student's name to their sweet preference, so each student gets the correct sweet.

Ans: Table is NOT sufficient for distribution. Need name-wise record of sweet preferences.

Shoe Size Activity — Ascending Order

Sushri Sandhya collected shoe sizes: 4 5 3 4 3 4 5 5 4 / 5 5 4 5 6 4 3 5 6 / 4 6 4 5 7 5 6 4 5

Arranged in ascending order: 3, 3, 3, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 6, 6, 6, 6, 7

Shoe Size	Tally Marks	Frequency
3		3
4		9
5		10
6		4
7		1

Q1. Help figure out the following:

Question	Answer
a. Largest shoe size in class?	7
b. Smallest shoe size in class?	3
c. Students wearing shoe size 5?	10 students
d. Students wearing shoe size larger than 4?	10 (size 5) + 4 (size 6) + 1 (size 7) = 15 students

Q2. How did ascending order help answer these questions?

Ascending order groups similar values together, making it easy to:

- Quickly spot the smallest (first number) and largest (last number) values.
- Count how many times each value appears without searching through the whole list.
- Identify patterns in the data (e.g., most common shoe size).

Ans: Ordering data makes counting frequencies faster and helps identify minimum, maximum, and most frequent values easily.

4.2 Pictographs

What is a Pictograph?

A PICTOGRAPH represents data using pictures or symbols.
Each symbol stands for a certain number (the SCALE or KEY).

Key features:

- Uses simple pictures/symbols to represent quantities
- A KEY or SCALE must always be shown (e.g., 1 symbol = 5 students)
- Easy to read and visually appealing
- Best for small, whole-number data

LIMITATION: Difficult when numbers don't divide evenly by the scale, or when data is very large.

Example 1 — Modes of Travel (Scale: 1 symbol = 1 student)

Mode of Travel	Number of Students (☺ = 1 student)
Private Car	☺ ☺ ☺ ☺
Public Bus	☺ ☺ ☺ ☺ ☺
School Bus	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
Cycle	☺ ☺ ☺
Walking	☺ ☺ ☺ ☺ ☺ ☺ ☺

Answers: Maximum: School Bus (11 students). Minimum: Cycle (3 students).

Example 2 — Sleep Data (Scale: 1 symbol = 10 children)

Nand Kishor collected data on how often children slept at least 9 hours:

Response	Number of Children (▲ = 10 children)
Always	▲ ▲ ▲ ▲ ▲ (5 symbols)
Sometimes	▲ ▲ ▲ (2 full + 1 half)
Never	▲ ▲ ▲ ▲ (4 symbols)

Questions on Sleep Pictograph:

1. Number of children who ALWAYS slept at least 9 hours?

Step 1: Count symbols for 'Always' = 5 symbols

Step 2: Each symbol = 10 children

Step 3: Total = $5 \times 10 = 50$ children

Ans: 50 children always slept at least 9 hours at night.

2. Children who SOMETIMES slept at least 9 hours?

Step 1: Count symbols for 'Sometimes' = 2 complete + 1 half

Step 2: 2 complete = $2 \times 10 = 20$ children

Step 3: Half symbol = half of 10 = 5 children

Step 4: Total = $20 + 5 = 25$ children

Ans: 25 children sometimes slept at least 9 hours at night.

3. Children who ALWAYS slept LESS than 9 hours?

'Never' slept 9 hours = those who always slept less than 9 hours

Step 1: Count symbols for 'Never' = 4 complete symbols

Step 2: Total = $4 \times 10 = 40$ children

Ans: 40 children always slept less than 9 hours each night.

Drawing a Pictograph — Step-by-Step

Lakhanpal collected absent students data. To draw a pictograph (1 symbol = 1 student):

Class	I	II	III	IV	V	VI	VII	VIII
No. of absent	3	5	4	2	0	1	5	7

TIP: When there are many students, 1 symbol = 1 student would use too many pictures. Use 1 symbol = 5 or 10 students instead to save space!

Jarina's Approach: 1 symbol = 5 students (Present students data)

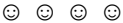
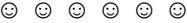
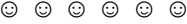
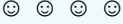
Class	Present Students	Calculation	Symbols
I	30	$30 \div 5 = 6$	
II	35	$35 \div 5 = 7$	
III	20	$20 \div 5 = 4$	
IV	25	$25 \div 5 = 5$	
V	30	$30 \div 5 = 6$	
VI	25	$25 \div 5 = 5$	
VII	30	$30 \div 5 = 6$	
VIII	20	$20 \div 5 = 4$	

Figure It Out — Pictographs

Q1 (Books Borrowed from Library): Answer questions from the pictograph.

Data: Mon=5, Tue=4, Wed=2, Thu=0, Fri=5, Sat=8 (1 symbol = 1 book)

Day	Books Borrowed (☐=1 book)	Count
Monday		5
Tuesday		4
Wednesday		2
Thursday	(none)	0
Friday		5
Saturday		8

(a) On which day were the MINIMUM books borrowed?

Ans: Thursday — 0 books were borrowed.

(b) Total books borrowed during the week?

Step 1: Add all: $5 + 4 + 2 + 0 + 5 + 8$

Step 2: Total = 24 books

Ans: 24 books were borrowed during the entire week.

(c) On which day were MAXIMUM books borrowed? Why?

Saturday has the most books (8).

Possible reason: Saturday is the last day before Sunday holiday. Students borrow more books to read over the weekend when there is no school.

Ans: Saturday (8 books). Reason: Students borrow more books before the weekend holiday.

Q2 (Kite Sales — Magan Bhai). Use 1 symbol (kite icon) = 100 kites.

Shopkeeper	Kites Sold	Symbols (kite icon = 100 kites)
Chaman	250	 (+ half = 2.5 symbols)
Rani	300	 (3 symbols)
Rukhsana	100	 (1 symbol)
Jasmeet	450	 (+ half = 4.5 symbols)
Jetha Lal	250	 (+ half = 2.5 symbols)
Poonam Ben	700	 (7 symbols)

(a) How many symbols represent kites Rani purchased?

Rani purchased 300 kites. $300 \div 100 = 3$ symbols.

Ans: 3 symbols represent Rani's kites.

(b) Who purchased the MAXIMUM number of kites?

Ans: Poonam Ben purchased the maximum — 700 kites (7 symbols).

(c) Who purchased more: Jasmeet or Chaman?

Jasmeet = 450 kites, Chaman = 250 kites. $450 > 250$.

Ans: Jasmeet purchased more kites (450 vs 250).

(d) Rukhsana says Poonam Ben bought more than double Rani's kites. Is she correct?

Step 1: Double of Rani's kites = $2 \times 300 = 600$ kites

Step 2: Poonam Ben's kites = 700 kites

Step 3: $700 > 600$ — Yes, Poonam Ben purchased MORE than double!

Ans: YES, Rukhsana is correct. $700 > 600$ (double of 300). Poonam Ben purchased more than double.

Q6 (Tractors in Villages). Pictograph with 1 symbol = 1 tractor.

From the pictograph: A=6, B=5, C=8, D=3, E=6 tractors

Village	No. of Tractors
Village A	6
Village B	5
Village C	8
Village D	3
Village E	6

(a) Village with smallest number of tractors?

Ans: Village D — 3 tractors (fewest).

(b) Village with most tractors?

Ans: Village C — 8 tractors (most).

(c) How many more tractors does Village C have than Village B?

Step 1: Village C = 8 tractors, Village B = 5 tractors

Step 2: Difference = $8 - 5 = 3$ more tractors

Ans: Village C has 3 more tractors than Village B.

(d) Village D has HALF the tractors of Village E — is Komal right?

Step 1: Village E = 6 tractors, Half of Village E = $6 \div 2 = 3$

Step 2: Village D = 3 tractors. $3 = 3$ ✓

Ans: YES, Komal is correct. Village D (3) = half of Village E (6).

Q7 (Girl Students Pictograph). 1 symbol = 4 girls.

From pictograph: Class 1=6 sym, 2=4.5 sym, 3=5 sym, 4=3.5 sym, 5=2.5 sym, 6=4 sym, 7=3 sym, 8=1.5 sym

Class	Symbols	Calculation	No. of Girls
1	6 full	6×4	24
2	4 full + 1 half	$4 \times 4 + 2$	18
3	5 full	5×4	20
4	3 full + 1 half	$3 \times 4 + 2$	14
5	2 full + 1 half	$2 \times 4 + 2$	10
6	4 full	4×4	16
7	3 full	3×4	12
8	1 full + 1 half	$1 \times 4 + 2$	6

(a) Which class has the LEAST girl students?

Ans: Class 8 has the least — only 6 girl students.

(b) Difference between girls in Class 5 and Class 6?

Step 1: Class 5 = 10 girls, Class 6 = 16 girls

Step 2: Difference = $16 - 10 = 6$ girls

Ans: Difference = $16 - 10 = 6$ girls

(c) If 2 more girls admitted in Class 2, how would graph change?

Class 2 currently: 18 girls (4 full + 1 half symbol = $4 \times 4 + 2 = 18$)

After 2 more: $18 + 2 = 20$ girls = exactly 5 full symbols.

Ans: The half symbol in Class 2 would become a full symbol ($18 + 2 = 20 = 5$ full symbols).

(d) How many girls in Class 7?

Step 1: Class 7 has 3 full symbols

Step 2: $3 \times 4 = 12$ girls

Ans: Class 7 has 12 girl students.

Q8 (Mudhol Hounds Pictograph):

Data: Village A=18, B=36, C=12, D=48, E=18, F=24

(a) What will be a useful scale for this pictograph?

Look at the numbers: 12, 18, 24, 36, 48. All are multiples of 6.

So, use 1 symbol = 6 dogs. This means all values divide evenly.

Ans: Scale: 1 symbol = 6 dogs (since all values are multiples of 6).

(b) How many symbols for Village B?

Step 1: Village B = 36 dogs

Step 2: $36 \div 6 = 6$ symbols

Ans: 6 symbols represent Village B's dogs.

(c) Village B + Village D together vs. other 4 villages — is Kamini right?

Step 1: Village B + Village D = $36 + 48 = 84$ dogs

Step 2: Other 4 villages: $A + C + E + F = 18 + 12 + 18 + 24 = 72$ dogs

Step 3: $84 > 72$, so YES Kamini is correct!

Ans: YES, Kamini is correct. Village B + D = $84 >$ other 4 villages = 72.

4.3 Bar Graphs — Reading and Interpretation

What is a Bar Graph?

A BAR GRAPH represents data using rectangular bars of equal width. The LENGTH or HEIGHT of each bar shows the frequency/quantity.

Key features of a bar graph:

- Bars are of EQUAL WIDTH and UNIFORM spacing between them
- Each bar represents ONE category
- A SCALE is chosen so the graph fits neatly on paper
- Scale markings MUST START FROM ZERO
- Can be VERTICAL (columns) or HORIZONTAL bars

ADVANTAGE over pictographs: Better for large data, easier to read exact values, easier to draw.

Example: Students Absent — Reading a Bar Graph

Lakhanpal's data on absent students (1 unit length = 1 student):

Class	I	II	III	IV	V	VI	VII	VIII
Absent	3	5	4	2	0	1	5	7

TIP: Reading a bar graph: Find the bar for the category → go horizontally to the vertical axis → read the number against the gridline.

Q1. In Class 2, _____ students were absent that day.

Look at the bar for Class 2. Its height = 5 units. 1 unit = 1 student.

Ans: 5 students were absent in Class 2.

Q2. In which class were the MAXIMUM students absent?

The tallest bar = Class VIII with height 7.

Ans: Class VIII had the maximum absent students (7 students).

Q3. Which class had FULL attendance?

Full attendance means 0 absent. The bar height = 0 → Class V.

Ans: Class V had full attendance (0 absent students).

Example: Traffic at Delhi Road Crossing (1 unit = 100 vehicles)

Time Interval	No. of Vehicles
6–7 a.m.	~150
7–8 a.m.	1200 (maximum)
8–9 a.m.	1000
9–10 a.m.	800
10–11 a.m.	700
11–12 noon	~600 (second minimum)

Figure It Out — Traffic Bar Graph

Q1. Total vehicles from 6 a.m. to noon?

Step 1: Add all hourly counts:

Step 2: $150 + 1200 + 1000 + 800 + 700 + 600 = 4450$ vehicles

Ans: Approximately 4,450 vehicles passed through the crossing from 6 a.m. to noon.

Q2. Why so little traffic during 6–7 a.m.?

6–7 a.m. is very early. Most people are still sleeping or at home. Schools and offices haven't opened yet, so fewer vehicles are on the road.

Ans: Very early morning — most people haven't started their day yet. Schools/offices are not open.

Q3. Why was traffic HEAVIEST during 7–8 a.m.?

7–8 a.m. is peak office and school hours. Parents dropping children to school, workers going to offices, all travel at this time creating maximum traffic.

Ans: School and office rush hour — maximum number of people commuting simultaneously.

Q4. Why did traffic decrease each hour after 8 a.m. until noon?

After 8 a.m., most people have already reached their destinations (school/office). Fewer people need to travel, so traffic reduces steadily each hour.

Ans: Most commuters reached their destinations by 8–9 a.m. Later hours see progressively less travel.

4.4 Drawing a Bar Graph — Step-by-Step

Steps to Draw a Bar Graph

Step 1: Draw two perpendicular lines — horizontal (X-axis) and vertical (Y-axis).

Step 2: Label the X-axis with categories (equally spaced).

Step 3: Choose an appropriate SCALE for the Y-axis.

Rule: $\text{Scale} = \text{frequency} \div \text{available space}$. Use round numbers (1, 2, 5, 10, 100, etc.)

Step 4: Mark the Y-axis values from 0 upward in equal steps.

Step 5: Draw bars of EQUAL WIDTH and EQUAL SPACING for each category.

Step 6: The height of each bar = $\text{frequency} \div \text{scale}$.

Step 7: Add a TITLE and label both axes.

IMPORTANT: Always start the Y-axis from ZERO!

Example 1 — Sweet Preferences (Scale: 1 unit = 1 student)

Sweet	No. of Students	Bar Height (1 unit = 1 student)
Jalebi	6	6 units
Gulab Jamun	9	9 units
Gujiya	13	13 units (TALLEST)
Barfi	3	3 units

Rasgulla	7	7 units
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Most popular sweet: GUJIYA (13 students — tallest bar)

Least popular sweet: BARFI (3 students — shortest bar)

Example 2 — Runs Scored by Smriti (Scale: 1 unit = 10 runs)

Match	1	2	3	4	5	6	7	8
Runs	80	50	10	100	90	0	90	50
Bar height	8 units	5 units	1 unit	10 units	9 units	0 units	9 units	5 units

Highest score: Match 4 (100 runs). Match 6 scored 0 runs.

TIP: Choosing Scale: If max value = 100, don't use 1 unit = 1 run (would need 100 gridlines!). Use 1 unit = 10 runs — much easier!

Example 3 — Imran's Family Monthly Expenditure

Item	Expenditure (Rs.)	Scale: 1 unit = Rs. 200	Bar Height
House Rent	3000	$3000 \div 200$	15 units
Food	3400	$3400 \div 200$	17 units (TALLEST)
Education	800	$800 \div 200$	4 units
Electricity	400	$400 \div 200$	2 units
Transport	600	$600 \div 200$	3 units
Miscellaneous	1200	$1200 \div 200$	6 units

Q1. On which item does Imran's family spend MOST and SECOND MOST?

Step 1: Most spending: Food = Rs. 3400 (tallest bar)

Step 2: Second most: House Rent = Rs. 3000 (second tallest bar)

Ans: Most: Food (Rs. 3400). Second most: House Rent (Rs. 3000).

Q2. Is the cost of electricity about HALF the cost of education?

Step 1: Electricity = Rs. 400

Step 2: Education = Rs. 800

Step 3: Half of Education = $\text{Rs. } 800 \div 2 = \text{Rs. } 400 = \text{Electricity} \checkmark$

Ans: YES, electricity (Rs.400) is exactly half the cost of education (Rs.800).

Q3. Is education less than ONE-FOURTH of food cost?

Step 1: Food = Rs. 3400, One-fourth = $3400 \div 4 = \text{Rs. } 850$

Step 2: Education = Rs. 800 < Rs. 850 ✓

Ans: YES, education (Rs.800) is less than one-fourth of food ($\text{Rs.}3400 \div 4 = \text{Rs.}850$).

Figure It Out — Drawing Bar Graphs

Q1 (Samantha's Tea Garden Insects — Bar Graph):

Insect	Count	Scale: 1 unit = 1	Bar Height
Mites	6	6 units	6
Caterpillars	10	10 units	10 (TALLEST)
Beetles	5	5 units	5
Butterflies	3	3 units	3
Grasshoppers	2	2 units	2 (SHORTEST)

Most common: Caterpillars (10). Least common: Grasshoppers (2).

Scale chosen: 1 unit = 1 insect (since max = 10, this works neatly on paper)

Q2 (Pooja's Railway Tickets Bar Graph):

City	Tickets Sold	Bar Length (Scale: 1 unit = 4 tickets)	Notes
Vidisha	24	$24 \div 4 = 6$ units	Given bar = 6 units ✓
Jabalpur	20	$20 \div 4 = 5$ units	Given bar = 5 units ✓
Seoni	16	$16 \div 4 = 4$ units	Bar in graph is correct
Indore	28	$28 \div 4 = 7$ units	Bar in graph is INCORRECT (needs correction)
Sagar	16	$16 \div 4 = 4$ units	Bar needs to be drawn

(a) Tickets for Vidisha?

Ans: 24 tickets sold for Vidisha.

(b) Tickets for Jabalpur?

Ans: 20 tickets sold for Jabalpur.

(c) What is the scale of this graph?

Step 1: Vidisha bar = 6 units, Vidisha tickets = 24

Step 2: Scale = $24 \div 6 = 4$ tickets per unit length

Ans: Scale: 1 unit length = 4 tickets.

(f) Are bars for Seoni and Indore correct?

Step 1: Seoni: $16 \text{ tickets} \div 4 = 4 \text{ units}$. Check graph — if bar = 4 units: CORRECT

Step 2: Indore: $28 \text{ tickets} \div 4 = 7 \text{ units}$. Check graph — if bar $\neq 7$ units: INCORRECT

Ans: Seoni bar is CORRECT. Indore bar is INCORRECT and must be redrawn at 7 units height.

Q3 (Chinu's Transport Data — Frequency Table):

Means of Transport	Count	Tally Marks
Bike	13	
Bicycle	8	
Auto Rickshaw	8	
Scooter	9	
Car	6	
Bus	4	
Bullock Cart	2	

(b) Most used transport: BIKE — appeared 13 times (highest frequency).

(c) How would you collect this data? Write steps.

Step 1: Prepare a table with columns: Mode of Transport | Tally Marks | Frequency.

Step 2: Stand at the roadside with a pen and notebook.

Step 3: As each vehicle passes, identify its type and put a tally mark in the correct row.

Step 4: After 1 hour, count all tally marks to get the frequency.

Step 5: Verify total: sum of all frequencies = total vehicles observed.

Ans: Use tally marks to record each vehicle as it passes. Count at the end to get frequency.

Q5 (Bumrah's Wicket Data):

Wickets Taken	No. of Matches	Total Wickets (Wickets $\times$ Matches)
0	2	$0 \times 2 = 0$
1	4	$1 \times 4 = 4$
2	6	$2 \times 6 = 12$
3	8	$3 \times 8 = 24$
4	3	$4 \times 3 = 12$
5	5	$5 \times 5 = 25$

6	1	$6 \times 1 = 6$
7	1	$7 \times 1 = 7$
TOTAL	30 matches	$0+4+12+24+12+25+6+7 = 90$ wickets

(a) What information does this table give?

Ans: It shows how many wickets Jaspreet Bumrah took in each of his last 30 matches and how frequently each wicket count occurred.

(b) What could be the title?

Ans: 'Wickets Taken by Jaspreet Bumrah in His Last 30 Matches'

(c) What is attention-catching in this table?

Ans: In 1 match, Bumrah took 7 wickets — an exceptional performance worth noting!

(d) Matches where Bumrah took 4 wickets?

Ans: 3 matches (Number of Matches column shows 3 for wickets=4).

(e) Mayank says add $0+1+2+\dots+7$ to get total wickets. Is he correct?

NO, Mayank is WRONG. This would just give $0+1+2+3+4+5+6+7 = 28$.

But Bumrah didn't play 1 match each — e.g., he took 3 wickets in 8 DIFFERENT matches = 24 wickets from just that row.

Ans: NO — must multiply wickets $\times$ number of matches for each row, then add.

(f) How to correctly find total wickets?

Step 1: For each row, multiply: Wickets Taken $\times$ Number of Matches

Step 2: $0 \times 2 + 1 \times 4 + 2 \times 6 + 3 \times 8 + 4 \times 3 + 5 \times 5 + 6 \times 1 + 7 \times 1$

Step 3: $= 0 + 4 + 12 + 24 + 12 + 25 + 6 + 7$

Step 4: = 90 total wickets

Ans: Total wickets = $0+4+12+24+12+25+6+7 = 90$ wickets in 30 matches.

Q9 (Free Time Activities Bar Graph — Scale: 1 unit = 5 students):

Activity	No. of Students	Bar Height (1 unit = 5)
Playing	45	$45 \div 5 = 9$ units (TALLEST)
Reading Story Books	30	$30 \div 5 = 6$ units
Watching TV	20	$20 \div 5 = 4$ units

Listening to Music	10	$10 \div 5 = 2$ units (SHORTEST)
Painting	15	$15 \div 5 = 3$ units

Ans: Activity preferred most (other than playing): Reading Story Books (30 students).

Q10 (Tree Saplings Bar Graph):

From the bar graph: Mon=50, Tue=40, Wed=30, Thu=40, Fri=50, Sat=60, Sun=40

(a) Total saplings on Wednesday and Thursday?

Step 1: Wednesday = 30 saplings, Thursday = 40 saplings

Step 2: Total = $30 + 40 = 70$ saplings

Ans: 70 saplings were planted on Wednesday and Thursday combined.

(b) Total saplings planted during the whole week?

Step 1: Add all days: $50 + 40 + 30 + 40 + 50 + 60 + 40$

Step 2: Total = 310 saplings

Ans: 310 saplings were planted during the entire week.

(c) Greatest and least saplings — which day and why?

Greatest: Saturday (60 saplings) — Weekend, more people available to help.

Least: Wednesday (30 saplings) — Mid-week, full school and work schedules.

Ans: Most: Saturday (60). Least: Wednesday (30). Reason: More volunteers available on weekends.

Q11 (Tiger Population Bar Graph — Mistakes):

Year	Actual Tigers	Correct Bar Length (1 unit = 200 tigers)
2006	1400	$1400 \div 200 = 7$ units
2010	1700	$1700 \div 200 = 8.5$ units
2014	2200	$2200 \div 200 = 11$ units
2018	3000	$3000 \div 200 = 15$ units
2022	3700	$3700 \div 200 = 18.5$ units

Ans: Mistakes in bars for 2006, 2010, 2014, 2018. The bars must be redrawn to correct heights as per scale.

4.5 Artistic and Aesthetic Considerations

Making Graphs Visually Appealing

When making graphs, consider:

1. FIT: Choose a scale so the graph fits neatly in the available space.
2. CLARITY: Label all axes, add titles, use readable font sizes.
3. ORIENTATION: Use VERTICAL bars for heights, VERTICAL things.
Use HORIZONTAL bars for lengths, distances (parallel to ground).
4. COLOUR: Use consistent, appealing colours for different categories.

INFOGRAPHICS = Bar graphs + artistic visual imagery = more attractive and engaging.

WARNING: Making graphs 'fancy' can sometimes MISLEAD the reader.

Example: Triangle-shaped bars (for mountains) make taller ones look wider too, implying taller mountains are always wider — which may not be true!

Tallest Mountains — Example Table:

Continent	Mountain	Height (m)
Asia	Everest	8,848
South America	Aconcagua	6,962
North America	Denali	6,194
Africa	Kilimanjaro	5,895
Europe	Elbrus	5,642
Antarctica	Vinson Massif	4,892
Australia	Kosciuszko	2,228

For mountains (height goes UP), a VERTICAL bar graph (column graph) is more intuitive and visually suggestive.

For rivers (length goes ACROSS the land), a HORIZONTAL bar graph is more natural.

Figure It Out — Section 4.5

Q1. For heights of tallest persons in each class — vertical or horizontal bars? Why?

Use VERTICAL bars (column graph).

Reason: Heights are measured UPWARD from the ground. Vertical bars growing upward naturally suggest and represent height, making the comparison more intuitive.

Ans: VERTICAL bars — because height is measured upward, and vertical bars visually match this concept.

Q2. For longest rivers on each continent — vertical or horizontal bars? Why?

Use HORIZONTAL bars.

Reason: River lengths are measured along the ground (horizontal direction). Horizontal bars naturally suggest this and are more intuitive for comparing lengths.

Ans: HORIZONTAL bars — because river lengths are horizontal features, and horizontal bars better represent this visually.

Longest Rivers on Each Continent:

Continent	Longest River	Approx. Length (km)
Africa	Nile	6,650
South America	Amazon	6,400
Asia	Yangtze	6,300
North America	Missouri-Mississippi	6,275
Europe	Volga	3,690
Australia	Murray-Darling	3,750
Antarctica	Onyx (seasonal)	~30

Longest rivers: Africa (Nile) and South America (Amazon) have the longest rivers.

Chapter Summary

Key Concepts — Chapter 4

1. DATA: Any collection of facts, numbers, or observations that convey information.
2. TALLY MARKS: Used to count occurrences. Groups of 5 (|||| crossed) make counting easy.
3. FREQUENCY: The number of times a particular value/observation occurs in data.
4. FREQUENCY TABLE: Organises data in a table showing each category and its frequency.
5. PICTOGRAPH: Uses pictures/symbols to represent data. Scale must be specified.
 - Easy to read at a glance
 - Challenging when data doesn't divide evenly by scale
6. BAR GRAPH: Uses bars of equal width, with height/length = frequency.
 - Scale must be chosen appropriately
 - Y-axis always starts from ZERO
 - Easier than pictographs for large data
7. VERTICAL vs HORIZONTAL bars:
 - Vertical (column graph): for heights, temperatures (things measured upward)
 - Horizontal: for lengths, distances (things measured sideways)
8. INFOGRAPHICS: Artistic versions of data graphs. More appealing but can mislead.

KEY RULE: Always read graphs carefully — a 'pretty' graph can sometimes mislead!