Chapter 4: Data Handling and Presentation

CONTENTS 7 exercises · 25 questions

4.1	Collecting and Organising Data	3 Q
4.2	Collecting and Organising Data — Tally Table	2 Q
4.3	Collecting and Organising Data — Shoe Sizes	1 Q
4.4	Pictographs — Books Borrowed	2 Q
4.5	Bar Graphs — Vehicular Traffic	2 Q
4.6	Drawing a Bar Graph	13 Q
4.7	Artistic and Aesthetic Considerations	2 Q

Exercise 4.1 — Collecting and Organising Data

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

SOLUTION

Count how many students chose each game by organising the raw list into a tally/frequency table.

From the list: Kabaddi – 6, Satoliya (Pittu) – 5, Badminton – 2, Hockey – 8, Football – 4, Cricket – 6.

The game with the highest frequency is the most popular.

Answer: Organise the data into a frequency table by counting how many students chose each game, then identify the game with the highest count.

Q2 What is the most popular game in their class?

SOLUTION

Counting each game from the list:

Kabaddi: Mehnoor, Anaya, Simran, Ankita, Arsh, Sarah = 6

Satoliya (Pittu): Pushkal, Jivisha, Jivika, Nand, Hemal = 5

Badminton: Densy, Aarna = 2

Hockey: Jubimon, Leela, Afshan, Imon, Navjot, Gurpreet, Rehana, Ananya = 8

Football: Rajesh, Thara, Debabrata, Kompal = 4

Cricket: Soumya, Keerat, Yuvraj, Bhavya, Hardik, Tahira = 6

Hockey has the highest frequency of 8.

Answer: Hockey (8 students) is the most popular game.

Q3 Pari wants to respond to the questions given below. Put a tick (✓) for the questions where she needs to carry out data collection and put a cross (✗) for the questions where she doesn't need to collect data.

a. What is the most popular TV show among her classmates?

b. When did India get independence?

c. How much water is getting wasted in her locality?

d. What is the capital of India?

SOLUTION

a. The most popular TV show among classmates is not known without asking them — data collection needed. ✓

b. India's independence date (15 August 1947) is a known historical fact — no collection needed. ✗

c. The amount of water wasted in the locality varies and must be measured or surveyed — data collection needed. ✓

d. The capital of India (New Delhi) is a known fact — no collection needed. ✗

Answer: a. ✓ (needs data collection) b. ✗ c. ✓ (needs data collection) d. ✗

Exercise 4.2 — Collecting and Organising Data — Tally Table

Q1 Complete the table to help Shri Nilesh to purchase the correct numbers of sweets:

a. How many students chose jalebi?

b. Barfi was chosen by _____ students?

c. How many students chose gujiya?

d. Rasgulla was chosen by _____ students?

e. How many students chose gulab jamun?

SOLUTION

Count tally marks for each sweet:

Jalebi:					→ 5 + 1 = 6						
Gulab jamun:								→ 5 + 4 = 9			
Gujiya:											→ 5 + 5 + 3 = 13
Barfi:			→ 3								
Rasgulla:						→ 5 + 2 = 7					

Answer: a. 6 b. 3 c. 13 d. 7 e. 9

Q2 Is the above table sufficient to distribute each type of sweet to the correct student? Explain. If it is not sufficient, what is the alternative?

SOLUTION

The table shows only the number of students who chose each sweet, not which student chose which sweet.

So it is sufficient for purchasing the right quantities but not for distributing each sweet to the correct student.

Alternative: Make a list that maps each student's name to their chosen sweet.

Answer: No. The table records only counts per sweet, not which student chose which sweet. The alternative is to record each student's name alongside their sweet preference.

Exercise 4.3 — Collecting and Organising Data — Shoe Sizes

Q1 Help her to figure out the following:

a. The largest shoe size in the class is _____.

b. The smallest shoe size in the class is _____.

c. There are _____ students who wear shoe size 5.

d. There are _____ students who wear shoe sizes larger than 4.

SOLUTION

The shoe sizes arranged in ascending order: 3, 3, 3, 4, 4, 4, 4, 4, 4, 4, 4, 4, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 6, 6, 6, 6, 7

a. The last (largest) value = 7.

b. The first (smallest) value = 3.

c. Counting 5s: positions 13–22 → 10 students.

d. Sizes larger than 4 are 5, 6, 7: 10 fives + 4 sixes + 1 seven = 15 students.

Answer: a. 7 b. 3 c. 10 d. 15

Exercise 4.4 — Pictographs — Books Borrowed

Q1 The following pictograph shows the number of books borrowed by students in a week from the library of Middle School, Ginnori (each symbol = 1 book):
Monday: 5 books, Tuesday: 4 books, Wednesday: 2 books, Thursday: 0 books, Friday: 5 books, Saturday: 8 books.
a. On which day were the minimum number of books borrowed?
b. What was the total number of books borrowed during the week?
c. On which day were the maximum number of books borrowed? What may be the possible reason?

SOLUTION

Reading the pictograph (1 symbol = 1 book):
Monday = 5, Tuesday = 4, Wednesday = 2, Thursday = 0, Friday = 5, Saturday = 8

a. Thursday — 0 books (minimum).
b. Total = 5 + 4 + 2 + 0 + 5 + 8 = 24 books.
c. Saturday — 8 books (maximum). Possible reason: Sunday is a holiday, so students borrow books on Saturday to read over the weekend.

Answer: a. Thursday b. 24 books c. Saturday; students borrow books to read on Sunday (the holiday)

Q2 Magan Bhai sells kites at Jamnagar. Six shopkeepers from nearby villages come to purchase kites from him. The number of kites sold: Chaman – 250, Rani – 300, Rukhsana – 100, Jasmeet – 450, Jetha Lal – 250, Poonam Ben – 700. Prepare a pictograph using the symbol to represent 100 kites. Answer the following:
a. How many symbols represent the kites that Rani purchased?
b. Who purchased the maximum number of kites?
c. Who purchased more kites, Jasmeet or Chaman?
d. Rukhsana says Poonam Ben purchased more than double the number of kites that Rani purchased. Is she correct? Why?

SOLUTION

Scale: 1 symbol = 100 kites.
Chaman: 250 ÷ 100 = 2.5 symbols
Rani: 300 ÷ 100 = 3 symbols
Rukhsana: 100 ÷ 100 = 1 symbol

Jasmeet: 450 ÷ 100 = 4.5 symbols
Jetha Lal: 250 ÷ 100 = 2.5 symbols
Poonam Ben: 700 ÷ 100 = 7 symbols

a. Rani: 3 symbols.
b. Poonam Ben purchased the maximum (700 kites).
c. Jasmeet (450) > Chaman (250), so Jasmeet purchased more.
d. Double Rani = 2 × 300 = 600. Poonam Ben = 700 > 600. Yes, Rukhsana is correct.

Answer: a. 3 symbols b. Poonam Ben c. Jasmeet d. Yes; double Rani = 600, and Poonam Ben bought 700 > 600

Exercise 4.5 — Bar Graphs — Vehicular Traffic

Q1 Use the bar graph of the number of students absent in each class (1 unit length = 1 student; Class I – 3, II – 5, III – 4, IV – 2, V – 0, VI – 1, VII – 5, VIII – 7) to answer:

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

b. In which class were the maximum number of students absent?

c. Which class had full attendance that day?

SOLUTION

Reading the bar heights: Class I = 3, II = 5, III = 4, IV = 2, V = 0, VI = 1, VII = 5, VIII = 7.

a. Class 2 (II) bar height = 5 → 5 students were absent.

b. The tallest bar is Class 8 (VIII) with 7 → maximum absentees were in Class 8.

c. Full attendance means 0 absent. Class 5 (V) has a bar of height 0 → Class 5 had full attendance.

Answer: a. 5 b. Class 8 c. Class 5

Q2 How many total vehicles passed through the crossing between 6 a.m. and noon? (The bar graph shows: 6–7 a.m. ≈ 150, 7–8 a.m. = 1200, 8–9 a.m. = 1000, 9–10 a.m. = 800, 10–11 a.m. = 700, 11 a.m.–noon ≈ 600 vehicles.)

SOLUTION

Adding vehicles for each hourly interval:

6–7: 150

7–8: 1200

8–9: 1000

9–10: 800

10–11: 700

11–12: 600

Total = 150 + 1200 + 1000 + 800 + 700 + 600 = 4450 vehicles.

Answer: 4450 vehicles

Exercise 4.6 — Drawing a Bar Graph

Q1 Use the bar graph of Imran's family monthly expenditure (House rent: 3000, Food: 3400, Education: 800, Electricity: 400, Transport: 600, Miscellaneous: 1200) to answer: On which item does Imran's family spend the most and the second most?

SOLUTION

From the bar graph:
Food = 3400 (highest bar)
House rent = 3000 (second highest bar)

Answer: Most: Food (3400). Second most: House rent (3000).

Q2 Is the cost of electricity about one-half the cost of education?

SOLUTION

Electricity = 400
Education = 800
Half of education = 800 ÷ 2 = 400
400 = 400, so electricity is exactly half the cost of education.

Answer: Yes; electricity (400) = education (800) ÷ 2, so it is exactly half.

Q3 Is the cost of education less than one-fourth the cost of food?

SOLUTION

Food = 3400
One-fourth of food = 3400 ÷ 4 = 850
Education = 800
800 < 850, so education is less than one-fourth the cost of food.

Answer: Yes; one-fourth of food = 850, and education = 800 < 850.

Q4 Samantha visited a tea garden and collected data of the insects and critters she saw there: Mites – 6, Caterpillars – 10, Beetles – 5, Butterflies – 3, Grasshoppers – 2. Help her prepare a bar graph representing this data.

SOLUTION

Steps to draw the bar graph:

1. Draw horizontal and vertical axes.
2. Mark insect names equally spaced on the horizontal axis.
3. Choose scale: 1 unit length = 1 insect (since maximum = 10, this fits well).
4. Draw bars of heights: Mites = 6, Caterpillars = 10, Beetles = 5, Butterflies = 3, Grasshoppers = 2.
5. Label axes: horizontal = 'Insects', vertical = 'Number of Insects'.

Answer: Draw a bar graph with scale 1 unit = 1 insect; bar heights — Mites: 6, Caterpillars: 10, Beetles: 5, Butterflies: 3, Grasshoppers: 2.

Q5 Pooja collected data on tickets sold at Bhopal railway station: Vidisha – 24, Jabalpur – 20, Seoni – 16, Indore – 28, Sagar – 16. The bar graph has a portion erased.

a. Write the number of tickets sold for Vidisha above the bar.
b. Write the number of tickets sold for Jabalpur above the bar.
c. The bar for Vidisha is 6 unit lengths and the bar for Jabalpur is 5 unit lengths. What is the scale for this graph?
d. Draw the correct bar for Sagar.
e. Add the scale of the bar graph by placing the correct numbers on the vertical axis.
f. Are the bars for Seoni and Indore correct in this graph? If not, draw the correct bar(s).

SOLUTION

a. Vidisha = 24 tickets (write 24 above the bar).
b. Jabalpur = 20 tickets (write 20 above the bar).
c. Scale: Vidisha bar = 6 units for 24 tickets → 1 unit = 24 ÷ 6 = 4 tickets. Check: Jabalpur 20 ÷ 5 = 4. Scale is 1 unit length = 4 tickets.
d. Sagar = 16 tickets → bar height = 16 ÷ 4 = 4 unit lengths. Draw a bar of 4 units for Sagar.
e. Mark vertical axis: 4, 8, 12, 16, 20, 24, 28 (multiples of 4).
f. Seoni = 16 → 4 units (bar is correct). Indore = 28 → 28 ÷ 4 = 7 units (bar should

be 7 units; if it shows a different height, it is incorrect — draw correct 7-unit bar).

Answer: a. 24 b. 20 c. 1 unit = 4 tickets d. Bar of 4 units for Sagar e. Axis: 0, 4, 8, …, 28 f. Seoni bar is correct; Indore bar is incorrect — correct height is 7 units

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Q6 Chinu listed the various means of transport that passed across the road in front of his house from 9 a.m. to 10 a.m. (50 vehicles listed).
a. Prepare a frequency distribution table for the data.
b. Which means of transport was used the most?
c. If you were there to collect this data, how could you do it? Write the steps or process.

SOLUTION

a. Counting each type from Chinu's list:
Bike: 13, Auto Rickshaw: 8, Bicycle: 8, Scooter: 9, Car: 6, Bus: 4, Bullock Cart: 2

Frequency table:

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

b. Bike (13) was used the most.

c. Steps to collect the data:
(i) Prepare a two-column table: 'Means of Transport' and 'Frequency (Tally)'.
(ii) List all expected transport types in the first column.
(iii) Each time a vehicle passes, add a tally mark in the corresponding row.
(iv) After observation, convert tally marks to counts.

Answer: a. Bike: 13, Scooter: 9, Auto Rickshaw: 8, Bicycle: 8, Car: 6, Bus: 4, Bullock Cart: 2 b. Bike c. Prepare a tally table, add a mark for each passing vehicle, convert to counts.

Q7 Faiz prepared a frequency distribution table of data on the number of wickets taken by Jaspreet Bumrah in his last 30 matches:
Wickets: 0–2, 1–4, 2–6, 3–8, 4–3, 5–5, 6–1, 7–1 matches.
a. What information is this table giving?
b. What may be the title of this table?
c. What caught your attention in this table?
d. In how many matches has Bumrah taken 4 wickets?
e. Mayank says, 'If we want to know the total number of wickets he has taken in his last 30 matches, we have to add the numbers 0, 1, 2, 3 …, up to 7.' Can Mayank get the total number of wickets taken in this way? Why?
f. How would you correctly figure out the total number of wickets taken by Bumrah in his last 30 matches, using this table?

SOLUTION

a. The table gives the number of matches in which Bumrah took 0, 1, 2, 3, 4, 5, 6, or 7 wickets.

b. Possible title: 'Wickets Taken by Jaspreet Bumrah in Last 30 Matches'.

c. In just 1 match, Bumrah took 7 wickets — the highest single-match haul in the data.

d. Bumrah took 4 wickets in 3 matches.

e. No. Mayank's method (adding 0+1+2+…+7 = 28) gives the sum of wicket values, not the total wickets accounting for how many matches each occurred. For example, 3 wickets were taken in 8 matches = 24 wickets, not just 3.

f. Multiply each wicket count by its number of matches, then add all products:
0×2 + 1×4 + 2×6 + 3×8 + 4×3 + 5×5 + 6×1 + 7×1
= 0 + 4 + 12 + 24 + 12 + 25 + 6 + 7
= 90 wickets.

Answer: a. Number of matches with each wicket tally b. 'Wickets Taken by Jaspreet Bumrah in Last 30 Matches' c. He took 7 wickets in 1 match d. 3 matches e. No — must multiply each wicket count by matches, not just add values f. Total = 0×2 + 1×4 + 2×6 + 3×8 + 4×3 + 5×5 + 6×1 + 7×1 = 90 wickets

Q8 The following pictograph shows the number of tractors in five different villages (1 symbol = 1 tractor): Village A – 6, Village B – 5, Village C – 8, Village D – 3, Village E – 6.

a. Which village has the smallest number of tractors?

b. Which village has the most tractors?

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

d. Komal says, 'Village D has half the number of tractors as Village E.' Is she right?

SOLUTION

From the pictograph (1 symbol = 1 tractor):

A = 6, B = 5, C = 8, D = 3, E = 6

a. Village D has the smallest number: 3 tractors.

b. Village C has the most: 8 tractors.

c. C – B = 8 – 5 = 3 more tractors.

d. Half of E = 6 ÷ 2 = 3. Village D = 3. Yes, Komal is right.

Answer: a. Village D b. Village C c. 3 more tractors d. Yes; half of E (6) = 3 = Village D

Q9 The number of girl students in each class is depicted by a pictograph (1 symbol = 4 girls): Class 1 – 6 symbols, Class 2 – 4½ symbols, Class 3 – 5 symbols, Class 4 – 3½ symbols, Class 5 – 2½ symbols, Class 6 – 4 symbols, Class 7 – 3 symbols, Class 8 – 1½ symbols.

a. Which class has the least number of girl students?

b. What is the difference between the number of girls in Classes 5 and 6?

c. If two more girls were admitted in Class 2, how would the graph change?

d. How many girls are there in Class 7?

SOLUTION

Each full symbol = 4 girls; half symbol = 2 girls.

Class 1: 6 × 4 = 24

Class 2: 4 × 4 + 2 = 18

Class 3: 5 × 4 = 20

Class 4: 3 × 4 + 2 = 14

Class 5: 2 × 4 + 2 = 10

Class 6: 4 × 4 = 16

Class 7: 3 × 4 = 12

Class 8: 1 × 4 + 2 = 6

a. Class 8 has the least: 6 girls.
b. Class 6 – Class 5 = 16 – 10 = 6 girls difference.
c. Class 2 would have 18 + 2 = 20 girls = 5 full symbols. The half symbol becomes a full symbol (5 complete symbols instead of 4½).
d. Class 7: 3 × 4 = 12 girls.

Answer: a. Class 8 b. 6 girls c. The half symbol in Class 2 becomes a full symbol (5 complete symbols) d. 12 girls

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Q10 Mudhol Hounds in six villages: Village A – 18, Village B – 36, Village C – 12, Village D – 48, Village E – 18, Village F – 24. Prepare a pictograph and answer:
a. What will be a useful scale or key to draw this pictograph?
b. How many symbols will you use to represent the dogs in Village B?
c. Kamini said that the number of these dogs in Village B and Village D together will be more than the number of dogs in the other 4 villages. Is she right? Give reasons.

SOLUTION

a. The GCD of 18, 36, 12, 48, 18, 24 is 6. A useful scale is 1 symbol = 6 dogs, since all values are multiples of 6.

b. Village B = 36 dogs; symbols = 36 ÷ 6 = 6 symbols.

c. Village B + Village D = 36 + 48 = 84 dogs.
Other 4 villages: A + C + E + F = 18 + 12 + 18 + 24 = 72 dogs.
84 > 72, so Kamini is right.

Answer: a. 1 symbol = 6 dogs b. 6 symbols c. Yes; B + D = 84 > other 4 villages = 72

Q11 A survey of 120 school students: Playing – 45, Reading story books – 30, Watching TV – 20, Listening to music – 10, Painting – 15. Draw a bar graph using scale 1 unit length = 5 students. Which activity is preferred by most students other than playing?

SOLUTION

Bar heights (1 unit = 5 students):
Playing: 45 ÷ 5 = 9 units
Reading story books: 30 ÷ 5 = 6 units
Watching TV: 20 ÷ 5 = 4 units

Listening to music: 10 ÷ 5 = 2 units
Painting: 15 ÷ 5 = 3 units

Draw vertical bars with these heights on graph paper.
After playing (45), the next highest is Reading story books (30).

Answer: Draw bar graph with heights 9, 6, 4, 2, 3 units for the five activities. Reading story books (30 students) is preferred by most students other than playing.

Q12 Students and teachers planted saplings during the first week of July. The bar graph shows: Monday – 50, Tuesday – 40, Wednesday – 30, Thursday – 40, Friday – 50, Saturday – 60, Sunday – 40 saplings.
a. The total number of saplings planted on Wednesday and Thursday is _____.
b. The total number of saplings planted during the whole week is _____.
c. The greatest number of saplings were planted on _____ and the least on _____.

SOLUTION

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

a. Wednesday + Thursday = 30 + 40 = 70 saplings.
b. Total = 50 + 40 + 30 + 40 + 50 + 60 + 40 = 310 saplings.
c. Greatest = Saturday (60); Least = Wednesday (30).
Possible reason: More students/volunteers may have been available on Saturday (a non-school day), while Wednesday had fewer participants or unfavourable weather.

Answer: a. 70 b. 310 c. Greatest: Saturday; Least: Wednesday

Q13 Shagufta and Divya prepared a bar graph for the number of tigers in India (2006: 1400, 2010: 1700, 2014: 2200, 2018: 3000, 2022: 3700), but there are a few mistakes in the graph. Can you find those mistakes and fix them?

SOLUTION

The correct data:
2006: 1400, 2010: 1700, 2014: 2200, 2018: 3000, 2022: 3700

Examining the bar graph: the bars for 2006, 2010, 2014, and 2018 do not match

the correct values.
Specifically, the bar lengths appear in the wrong order or the bar for each year is drawn at an incorrect length relative to the scale.

To fix: ensure each bar is drawn so its length corresponds exactly to the number of tigers for that year, using a consistent scale (e.g., 1 unit = 1000 tigers):
2006: 1.4 units, 2010: 1.7 units, 2014: 2.2 units, 2018: 3.0 units, 2022: 3.7 units.

Answer: The bars for 2006, 2010, 2014, and 2018 are incorrect. Fix by drawing each bar to the correct length for 1400, 1700, 2200, and 3000 tigers respectively, using a consistent scale.

Exercise 4.7 — Artistic and Aesthetic Considerations

Q1 If you wanted to visually represent the data of the heights of the tallest persons in each class in your school, would you use a graph with vertical bars or horizontal bars? Why?

SOLUTION

Height is measured upwards from the ground, so a graph whose bars also grow upwards matches the quantity naturally.

Vertical bars (a column graph) let you compare the heights of the tallest persons directly by the heights of the bars.

(Both types can technically be used, but vertical bars are the more intuitive choice for heights.)

Answer: Vertical bars — height is an upward measurement, so the heights of the persons are best compared using the heights of vertical bars.

Q2 If you were making a table of the longest rivers on each continent and their lengths, would you prefer to use a bar graph with vertical bars or with horizontal bars? Why?

SOLUTION

The length of a river is a distance measured along the ground (a horizontal feature).

So a bar graph with horizontal bars matches the quantity: the lengths of the rivers are compared directly by the lengths of the horizontal bars.

(Both types can technically be used, but horizontal bars are the more intuitive choice for lengths.)

Answer: Horizontal bars — a river's length is a horizontal (ground-parallel) measurement, so the lengths are best compared using the lengths of horizontal bars.