Data Displays - Year 4

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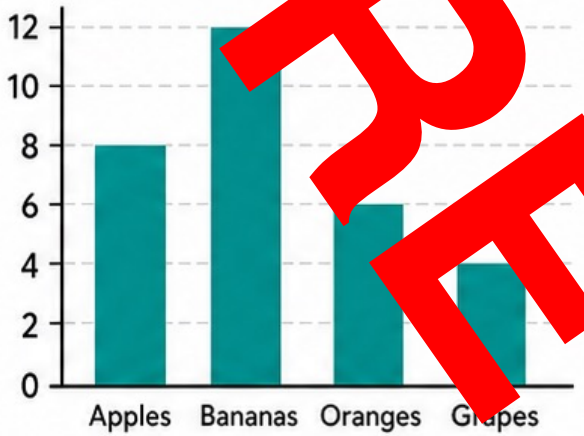
DISPLAY TOOLBOX

COLUMN GRAPH

Compare counts across categories.



PICTOGRAPH

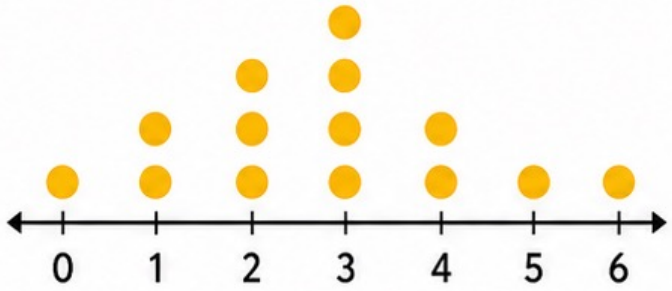
Use symbols.
Always read the key.

Apples	🍎🍎🍎🍎🍎
Bananas	🍌🍌🍌
Oranges	🍊🍊🍊🍊
Grapes	🍇🍇

🍎 = 2

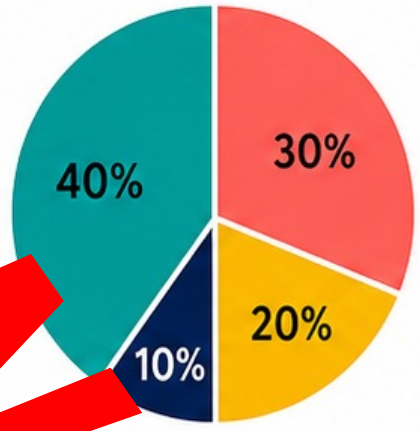
DOT PLOT

See clusters, gaps and spread.



PIE OR DOUGHNUT CHART

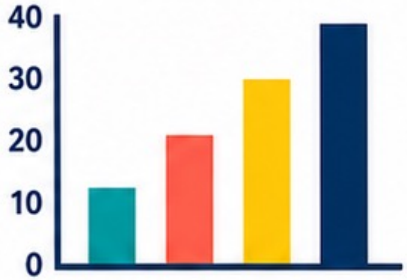
Show parts of a whole.



Choose the display that makes the data easiest to understand.

CLEAR, ACCURATE, USEFUL

- Clear title
- Axes or categories labelled
- Scale starts at zero and uses equal intervals
- Key or legend included when needed
- Data shown accurately
- Easy to compare and interpret






A display should answer the question, not confuse the reader.

GRAPH MATCH-UP – DATA SCENARIO CARDS

A

Compare how many students chose each favourite fruit.

B

Sh v the number of ks read by every dent.

C

Show how 40 votes are divided among four choices.

D

Use one symbol to represent two playground votes.

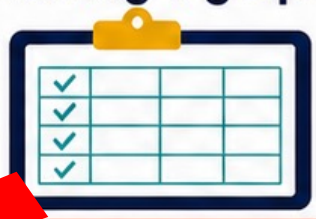
★ = 2

E

Show how ainfa changes ac s seven days.

F

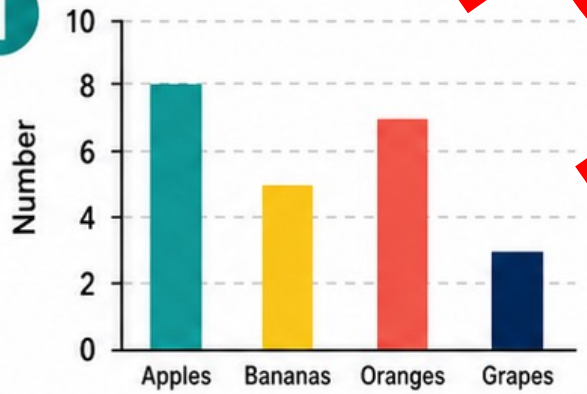
Keep exact values organised before making a graph.



Cut out the cards. Match each scenario to a display card and justify your choice.

GRAPH MATCH-UP — DISPLAY CARDS

1



COLUMN GRAPH

Compare category counts.

2

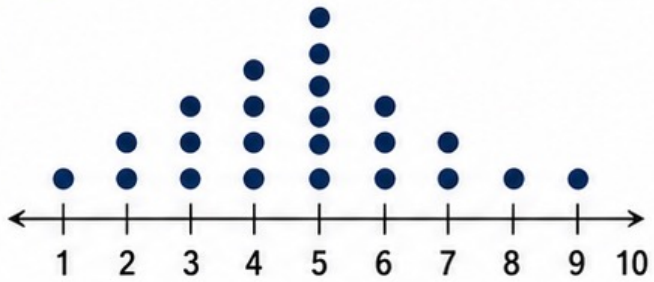
Fruit	Number of Students
ples	
Ba as	
ges	
Gra	

student

ICTOGRAPH

symbols a key.

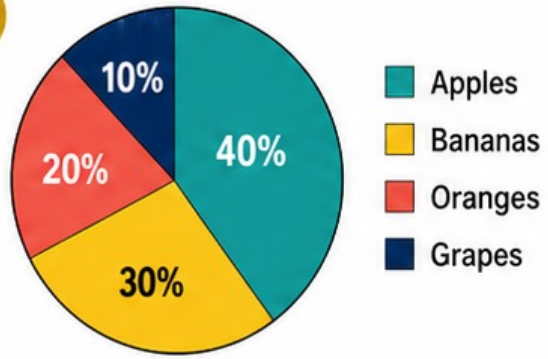
3



DOT PLOT

Show the distribution of numerical values.

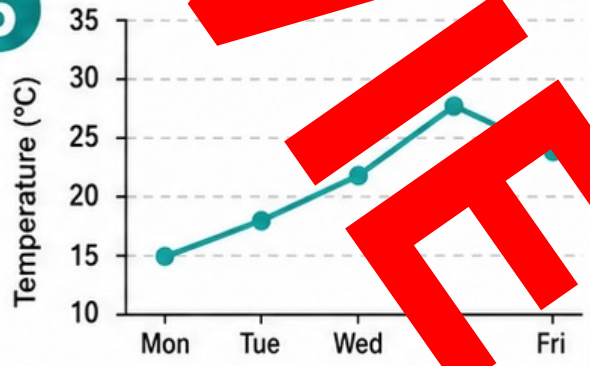
4



PIE OR DOUGHNUT CHART

Show parts of one whole.

5



LINE GRAPH

Show change over time.

6

Day	Rainfall (mm)
Monday	5
Tuesday	12
Wednesday	0
Thursday	8
Friday	14

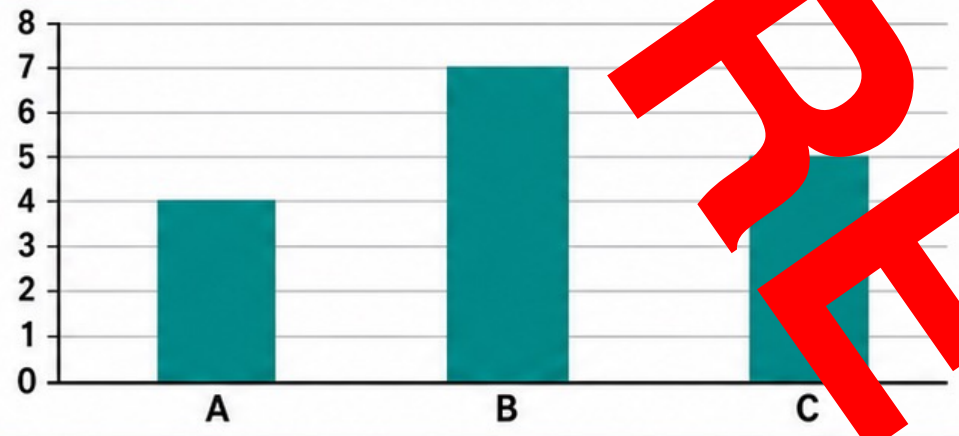
DATA TABLE

Organise exact values.

Match these cards to the scenario cards. More than one choice may be reasonable when you can justify it.

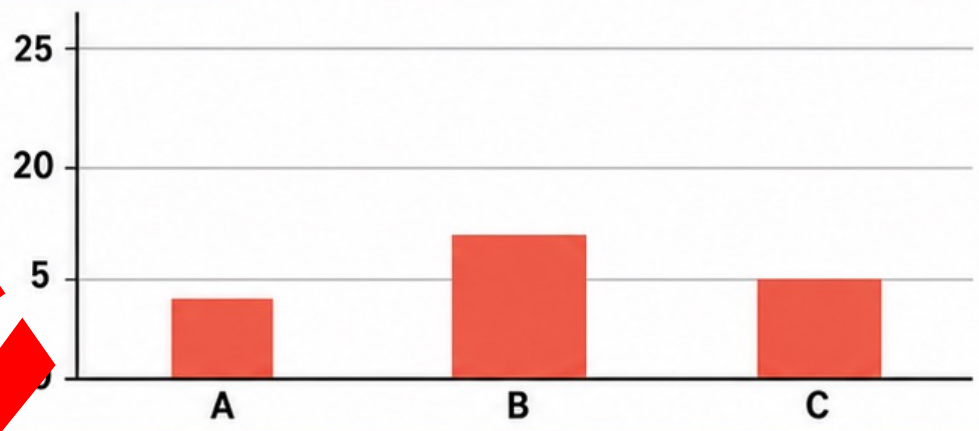
DATA DETECTIVES — CASES 1–4

CASE 1



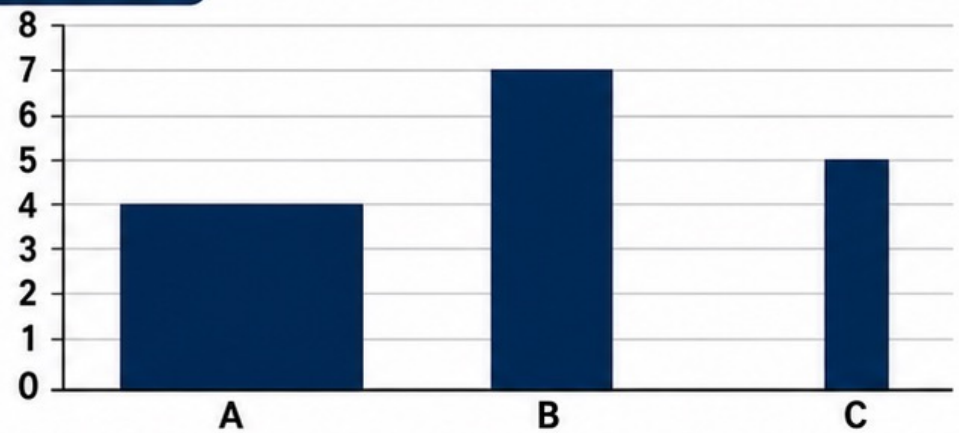
What is wrong? How would you fix it?

CASE 2



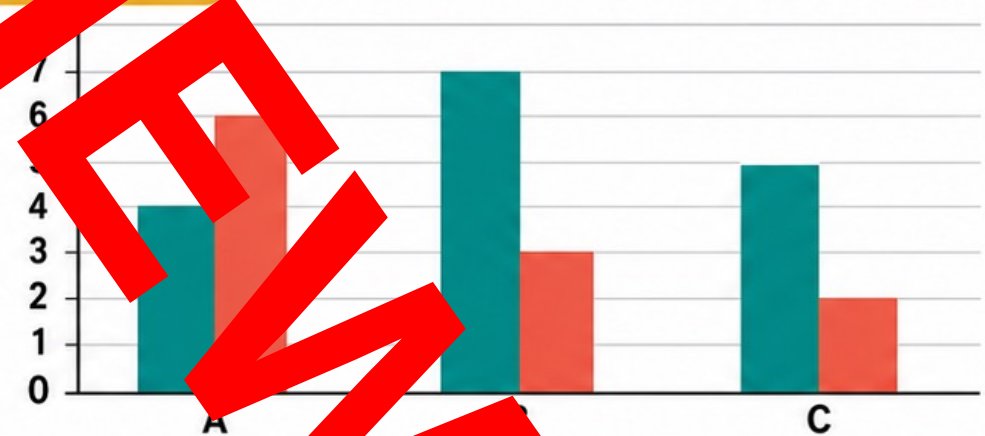
What is wrong? How would you fix it?

CASE 3



What is wrong? How would you fix it?

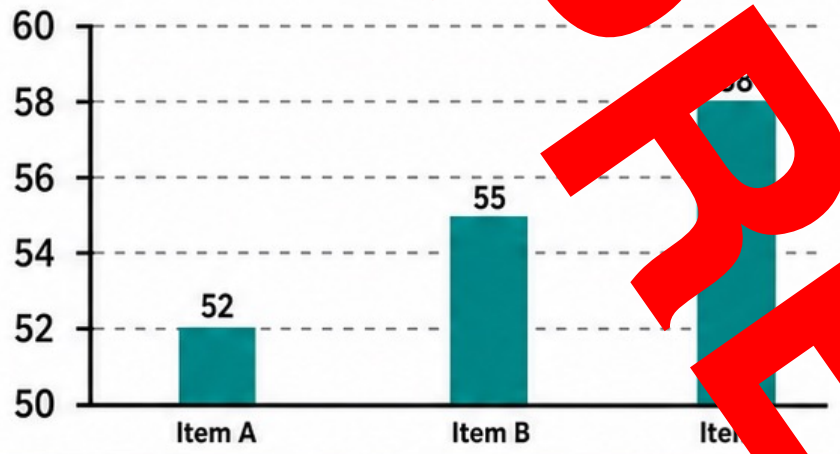
CASE 4



What is wrong? How would you fix it?

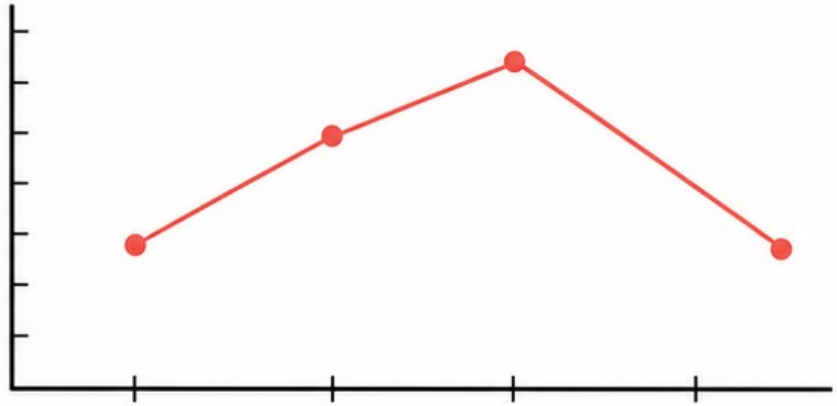
DATA DETECTIVES — CASES 5-8

CASE 5



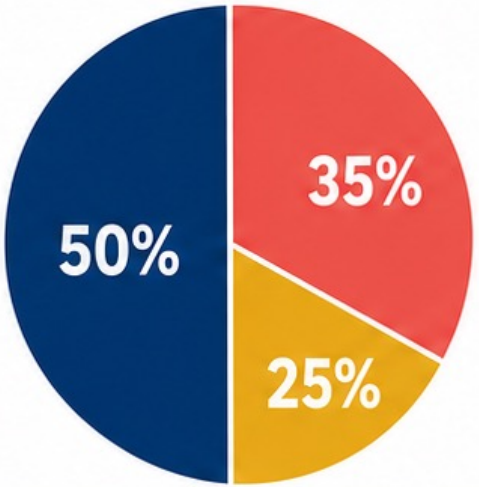
What is wrong? How would you fix it?

CASE 6



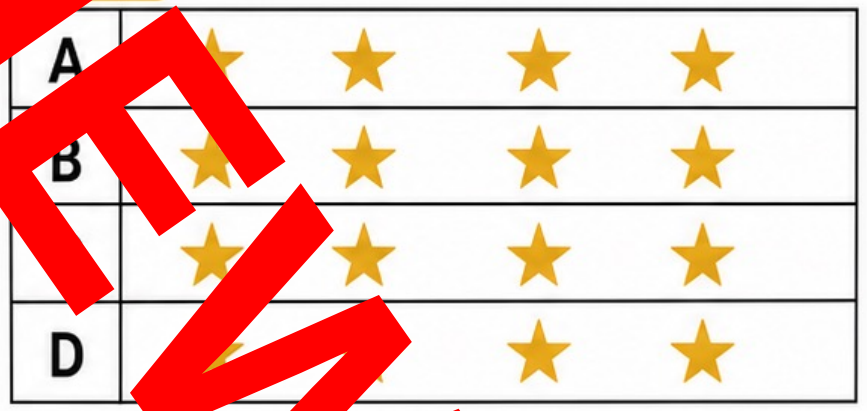
What is wrong? How would you fix it?

CASE 7



What is wrong? How would you fix it?

CASE 8



What is wrong? How would you fix it?

Name: _____

COLLECT, ORGANISE, DISPLAY

CATEGORICAL DATA

A Year 4 class voted for a new lunchtime club.

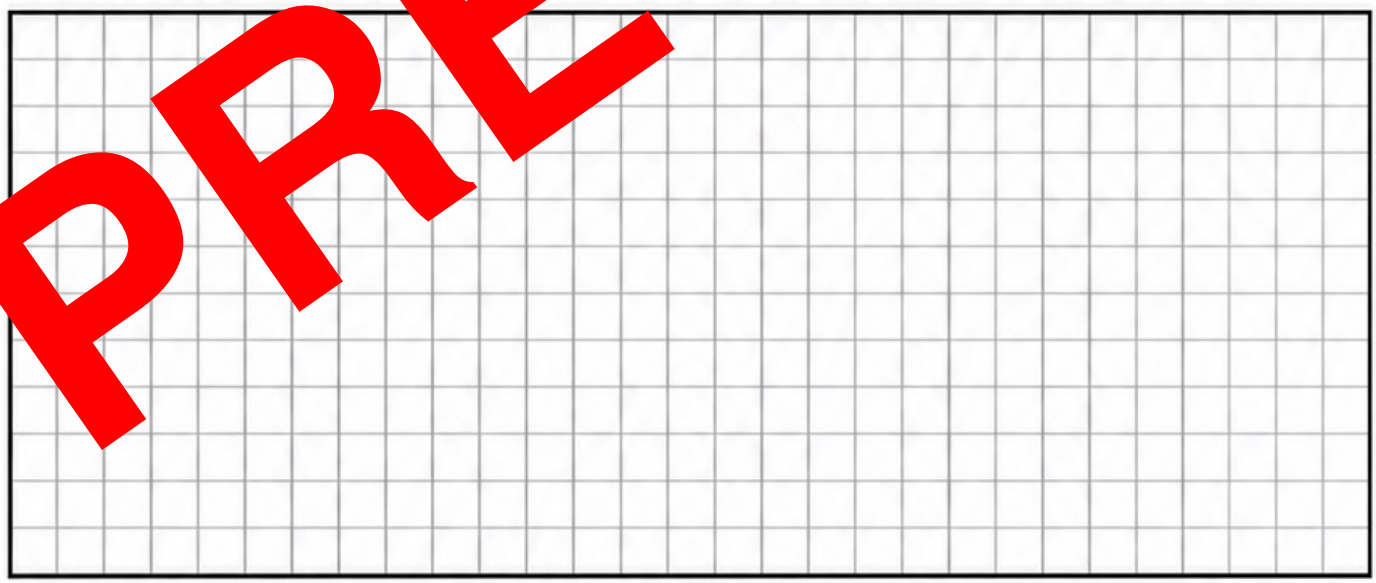
Club	Votes
Art	9
Chess	6
Gardening	12
Coding	8
Choir	5

1. How many students voted altogether?

2. Which club was the most popular?

3. How many more students cho Gar g th Choir?

4. On the grid, create a c n g . Include a titl , category labels and an even scale.



5. Why is a column graph suitable for this data?

Name: ANSWERS

COLLECT, ORGANISE, DISPLAY

CATEGORICAL DATA

A Year 4 class voted for a new lunchtime club.

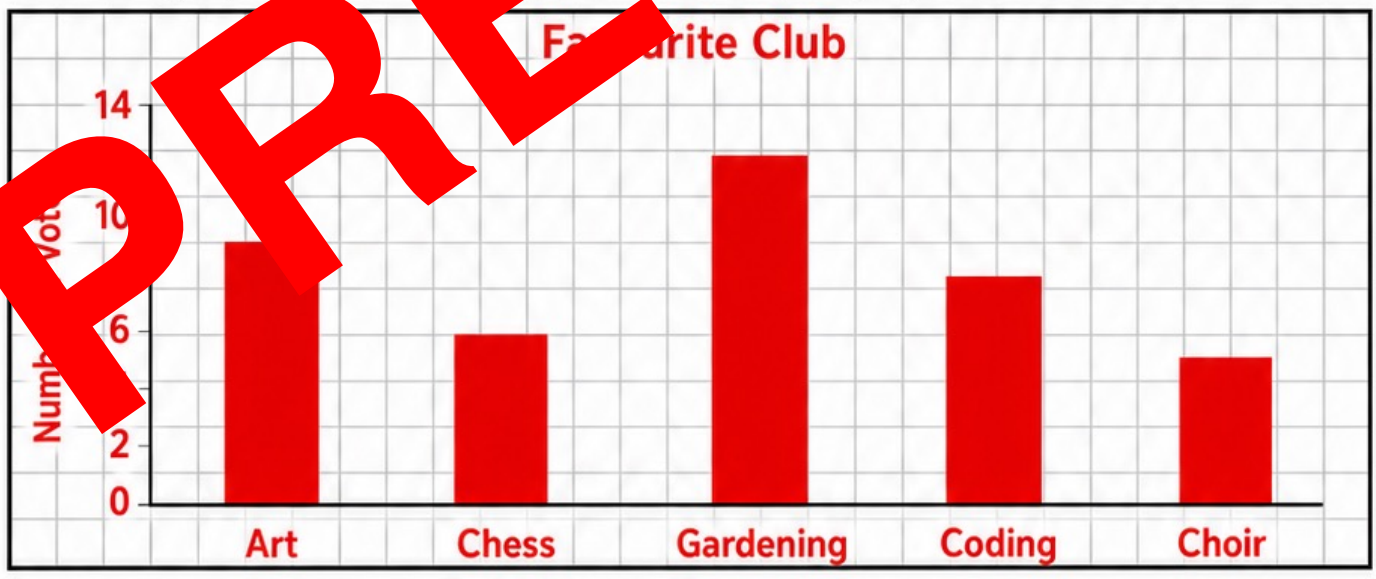
Club	Votes
Art	9
Chess	6
Gardening	12
Coding	8
Choir	5

1. How many students voted altogether?
   40

2. Which club was the most popular?
   Gardening

3. How many more students ch… Garde… tha… Choir?
   7

4. On the grid, create a co…n. Include a title, category labels and an even scale.



5. Why is a column graph suitable for this data?
   A column graph is suitable because it compares amounts across different categories, making it easy to see which category has more or fewer votes.

COLLECT, ORGANISE, DISPLAY
DISCRETE NUMERICAL DATA

Name: _____

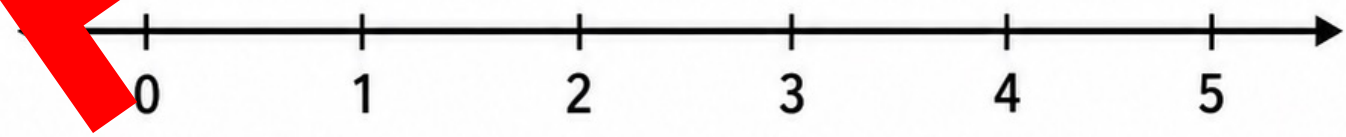
These are the numbers of library books borrowed by 16 students:

0, 1, 2, 2, 3, 1, 4, 2, 3, 5, 2, 1, 3, 4, 2, 0

1. Complete the frequency table.

Books	Frequency
0	
1	
2	
5	

2. Create a dot plot using the frequency table.



3. What is the range? _____

4. Where does the data cluster? _____

5. Which value occurs most often? _____

COLLECT, ORGANISE, DISPLAY
DISCRETE NUMERICAL DATA

Name: ANSWERS

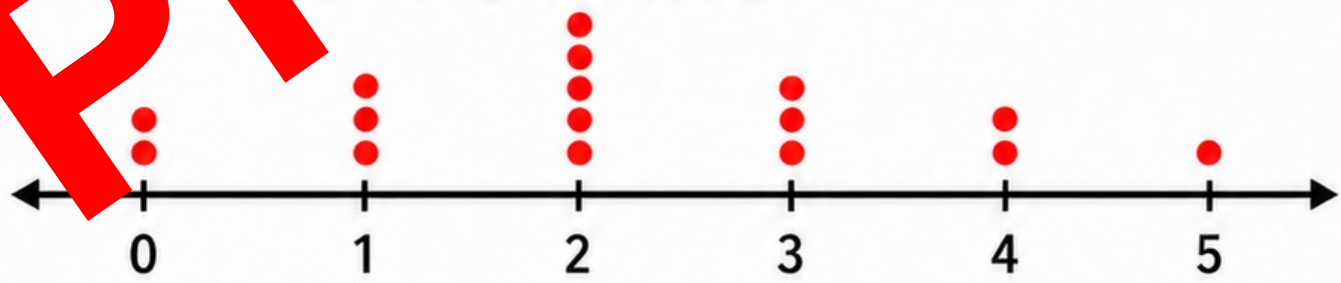
These are the numbers of library books borrowed by 16 students:

0, 1, 2, 2, 3, 1, 4, 2, 3, 5, 2, 1, 3, 4, 2, 0

1. Complete the frequency table.

Books	Frequency
0	
1	3
2	
3	3
4	2
5	1

2. Complete the dot plot using the frequency table.



3. What is the range? 5

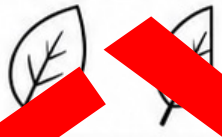
4. Where does the data cluster? 1 to 3 books

5. Which value occurs most often? 2 books

MANY-TO-ONE PICTOGRAPHS

INTERPRET THE KEY

Name: _____

Native seedlings planted	
Banksia	
Wattle	
Bottlebrush	
Grevillea	

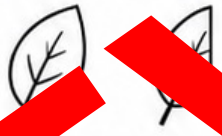
Key:  1 full leaf = 4 seedlings;  1 half leaf = 2 seedlings

1. How many Banksia seedlings were planted? _____
2. How many Wattle seedlings were planted? _____
3. How many Bottlebrush seedlings were planted? _____
4. How many Grevillea seedlings were planted? _____
5. How many seedlings were planted altogether? _____
6. How many more Banksia than Grevillea seedlings were planted? _____

MANY-TO-ONE PICTOGRAPHS

INTERPRET THE KEY

Name: ANSWERS

Native seedlings planted	
Banksia	
Wattle	
Bottlebrush	
Grevillea	

Key: 1 full leaf = 4 seedlings;  1 half leaf = 2 seedlings

1. How many Banksia seedlings were planted? 16
2. How many Wattle seedlings were planted? 12
3. How many Bottlebrush seedlings were planted? 10
4. How many Grevillea seedlings were planted? 6
5. How many seedlings were planted altogether? 44
6. How many more Banksia than Grevillea seedlings were planted? 10 more

Name: _____

MANY-TO-ONE PICTOGRAPHS

CREATE THE DISPLAY

The school recycling team sorted these items.

Item	Number collected
Paper	24
Plastic	12
Cans	18
Glass	6

1. Create a pictograph in the table below.

Key: 1 recycling bin symbol = 6 items

Paper	
Plastic	
Cans	
Glass	

2. How many bin symbols should be drawn for **Paper**?

_____

3. How many items were collected altogether?

_____

4. Which item needs 3 bin symbols?

_____

5. Explain why every number in the table works with this key.

_____

_____

_____

Name: ANSWERS

MANY-TO-ONE PICTOGRAPHS

CREATE THE DISPLAY

The school recycling team sorted these items.

Item	Number collected
Paper	24
Plastic	12
Cans	18
Glass	6

1. Create a pictograph in the table below.

Key: 1 recycling bin symbol = 6 items

Paper	
Plastic	
Cans	
Glass	

2. How many bin symbols should be drawn for **Paper**?

4

3. How many items were collected altogether?

60

4. Which item needs 3 bin symbols?

Cans

5. Explain why every number in the table works with this key.

All numbers are multiples of 6, so each can be shown with whole bin symbols.

Name: _____

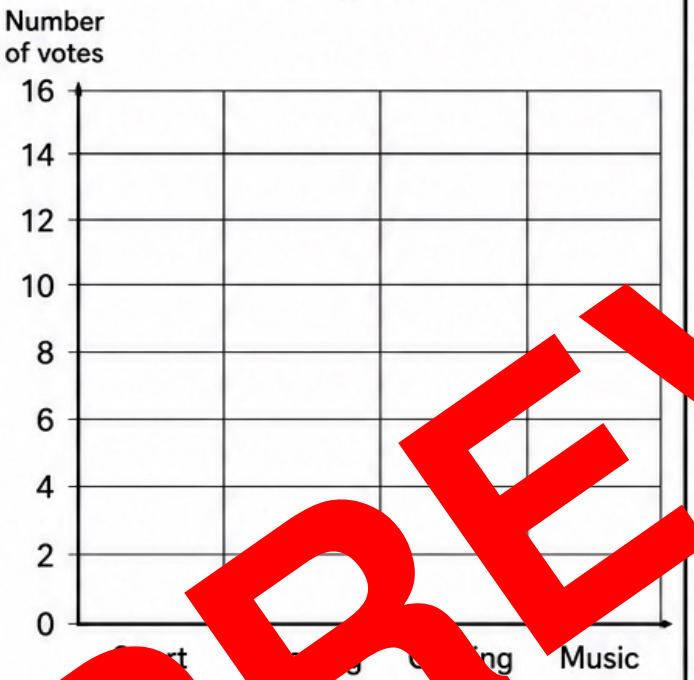
COMPARE DATA DISPLAYS

SAME DATA, DIFFERENT VIEW

Year 4 students voted for an after-school activity.

Activity	Number of votes
Sport	14
Reading	10
Gaming	8
Music	6

A. Column graph



B. Pict[illegible]ph

Activity	Nu[illegible] votes (1 star [illegible] tes)
S[illegible]t	
[illegible]eading	
[illegible]ming	
Music	

1 star = 2 votes

Compl[illegible] both [illegible]lays.

2. W[illegible] activity was most popular?

3. How many more votes did Sport receive than Music?

4. Which display makes exact values easier to read? Explain.

5. Which display gives a quicker visual comparison? Explain.

Name: ANSWERS

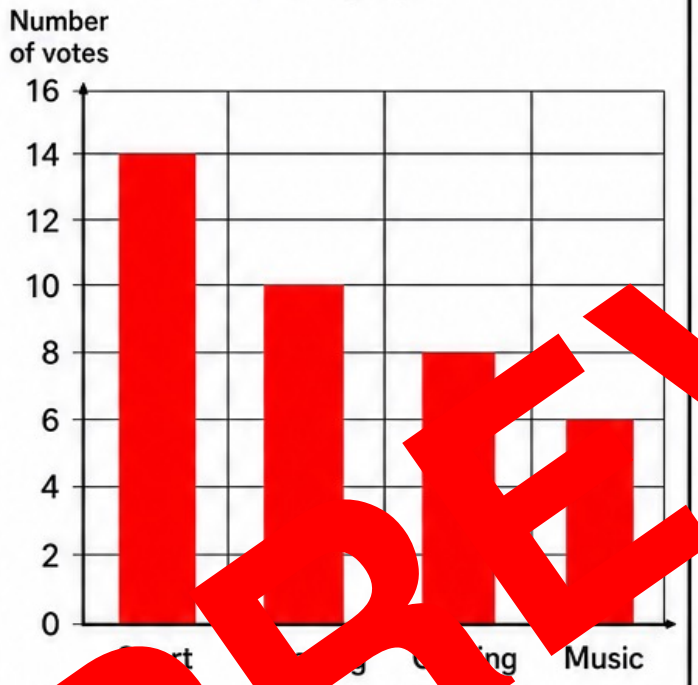
COMPARE DATA DISPLAYS

SAME DATA, DIFFERENT VIEW

Year 4 students voted for an after-school activity.

Activity	Number of votes
Sport	14
Reading	10
Gaming	8
Music	6

A. Column graph



B. Pict… ph

Activity	Nu… votes (1 star … tes)
S…rt	★★★★★★
…eading	★★★★★
…ming	★★★★
Music	★★★

1 star = 2 votes

Compl… both …lays.

2. W… activity was most popular?

Spo…

3. How many more votes did Sport receive than Music?

8

4. Which display makes exact values easier to read? Explain.

The column graph—its scale shows exact values clearly.

5. Which display gives a quicker visual comparison? Explain.

The column graph—bar lengths are quickest to compare.

Name: _____

CHOOSE THE BEST DATA DISPLAY

JUSTIFY YOUR DECISION

Situation	Best display	Why?
1. Favourite fruit choices: apple, banana, orange and pear.		
2. Number of siblings for each student in a class.		
3. How 40 class votes are split among four excursion choices.		
4. Daily rainfall measured across seve consecut day		

Display Toolbox

Column graph • Pictograph • Dot plot • Pie chart

5. Cou ore than one display work for a situation? Explain using one example.

6. What features make a data display clear, accurate and useful?

Name: ANSWERS

CHOOSE THE BEST DATA DISPLAY

JUSTIFY YOUR DECISION

Situation	Best display	Why?
1. Favourite fruit choices: apple, banana, orange and pear.	Column graph	Compares categorical counts clearly.
2. Number of siblings for each student in a class.	Dot plot	Shows th[illegible] of nu[illegible]s.
3. How 40 class votes are split among four excursion choices.	Pie chart	Sho[illegible] a whole [illegible]40 is divided.
4. Daily rainfall measured across seve[illegible] consecut[illegible] day[illegible]	Col[illegible]n g[illegible]h	Compares rainfall amounts across days.

Display Toolbox

Column graph • Pictograph • Dot plot • Pie chart

5. Cou[illegible]ore than one display work for a situation? Explain using one example.

Yes. Favourite fruit could use a column graph or pictograph; both compare categories.

6. What features make a data display clear, accurate and useful?

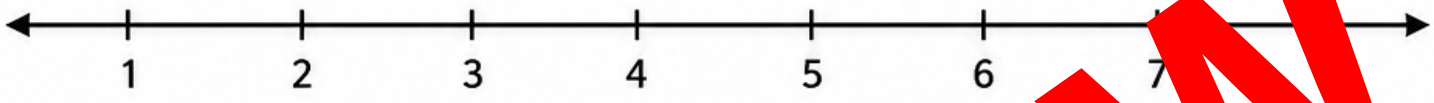
A clear title, correct labels, an even scale or key, accurate values and a sensible display choice.

Name: _____

DISTRIBUTION DETECTIVE

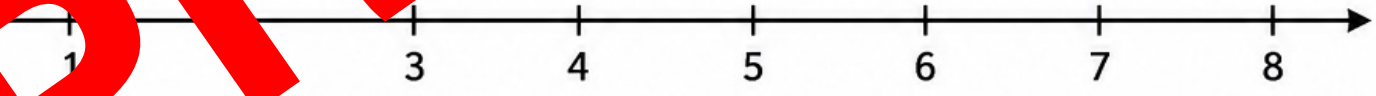
BUILD AND DESCRIBE DOT PLOTS

A. Data set A: 1, 2, 3, 4, 5, 6, 7, 8



B. Data set B: 3, 4, 4, 4, 5, 5, 5, 6

C. Data set C: 1, 1, 2, , 8



Data set	Cluster	Gap	Outlier	Spread / range
A				
B				
C				

Which data set is most evenly spread? Explain.

_____

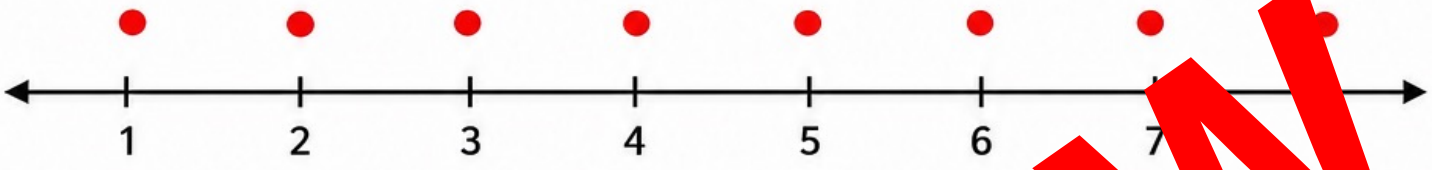
_____

Name: ANSWERS

DISTRIBUTION DETECTIVE

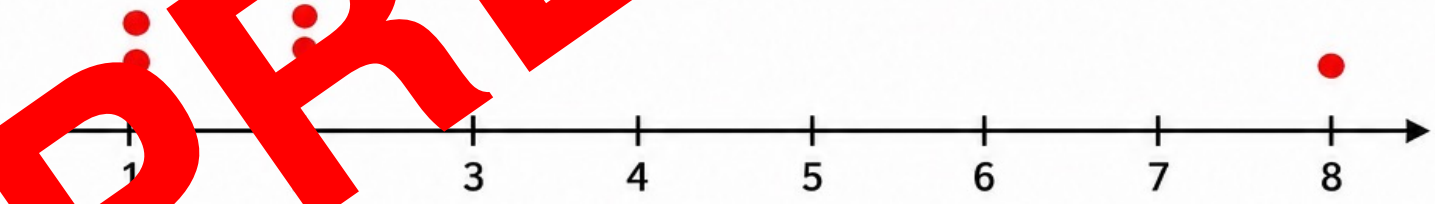
BUILD AND DESCRIBE DOT PLOTS

A. Data set A: 1, 2, 3, 4, 5, 6, 7, 8



B. Data set B: 3, 4, 4, 4, 5, 5, 5, 6

C. Data set C: 1, 1, 2, , 8



Data set	Cluster	Gap	Outlier	Spread / range
A	none	none	none	7
B	4–5	none	none	3
C	1–2	3–7	8	7

Which data set is most evenly spread? Explain.

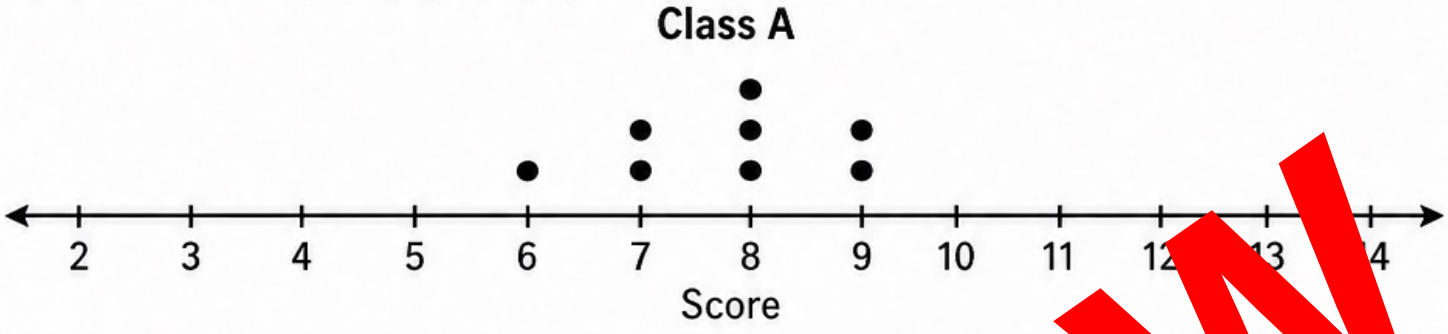
Data set A; its values are evenly spaced from 1 to 8.

Name: _____

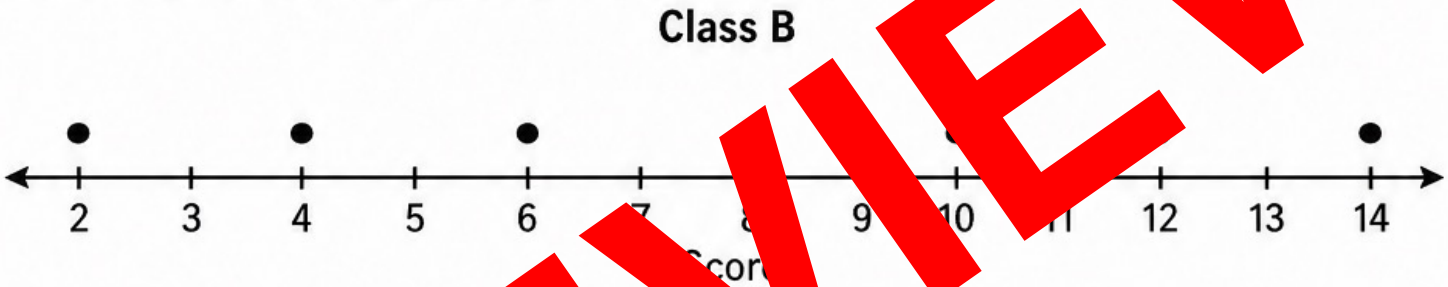
COMPARE DISTRIBUTIONS

SIMILAR CENTRE, DIFFERENT VARIATION

Class A scores: 6, 7, 7, 8, 8, 8, 9, 9



Class B scores: 2, 4, 6, 8, 9, 10, 12, 14



1. What is the range of Class A?

_____

2. What is the range of Class B?

_____

Which class has greater variation?

_____

4. Where does Class A cluster?

_____

5. Both classes include a score of 8. Does that mean their distributions are the same? Explain.

_____

_____

6. Write one sentence comparing the two distributions.

_____

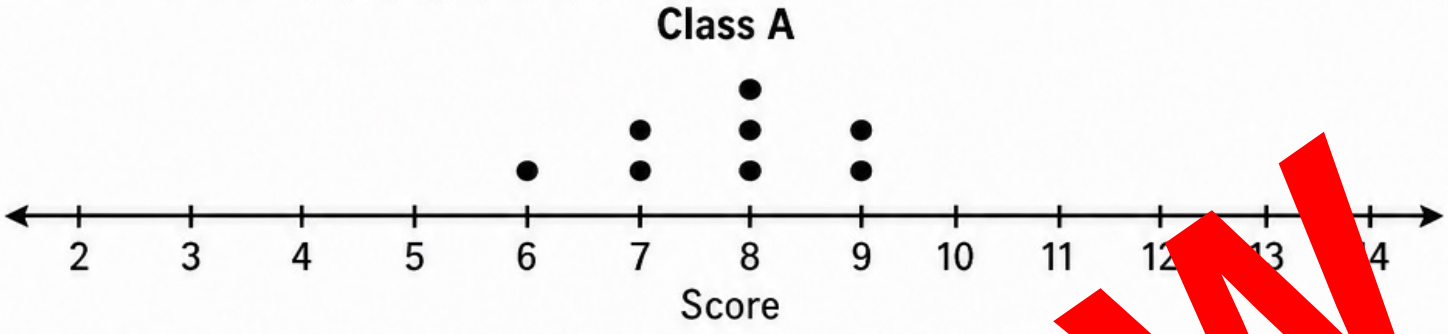
_____

Name: ANSWERS

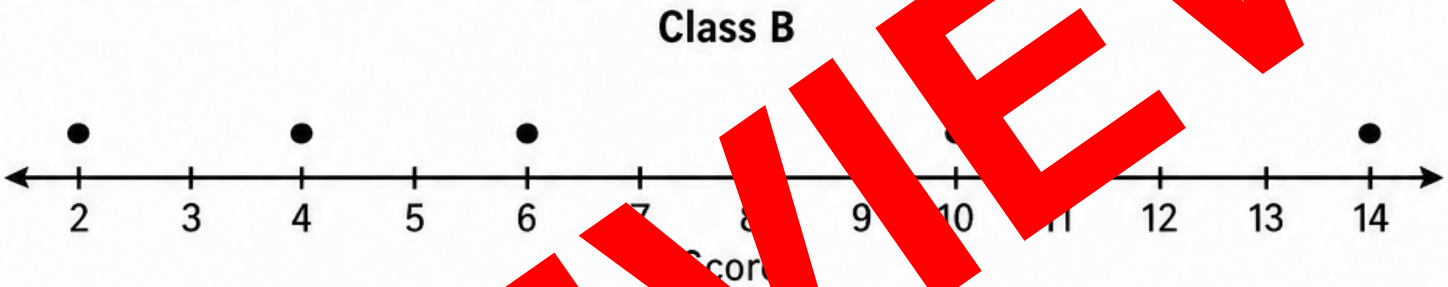
COMPARE DISTRIBUTIONS

SIMILAR CENTRE, DIFFERENT VARIATION

Class A scores: 6, 7, 7, 8, 8, 8, 9, 9



Class B scores: 2, 4, 6, 8, 9, 10, 12, 14



1. What is the range of Class A?
   3

2. What is the range of Class B?
   12

3. Which class has greater variation?
   Class B

4. Where does Class A cluster?
   7–9

5. Both classes include a score of 8. Does that mean their distributions are the same? Explain.
   No. Class A is tightly clustered, while Class B is much more spread out.

6. Write one sentence comparing the two distributions.
   Class A has less variation; Class B spans a much wider range.

Name: _____

REPAIR THE GRAPH

FIND, EXPLAIN, IMPROVE

A student made this graph about canteen sales.

Actual sales: Fruit 20, Sandwiches 35, Muffins 25, Yoghurt 10.

1. List four problems with this graph.

1. _____
2. _____
3. _____
4. _____

2. Explain how on[illegible]em c[illegible] mislead[illegible] reader.

_____

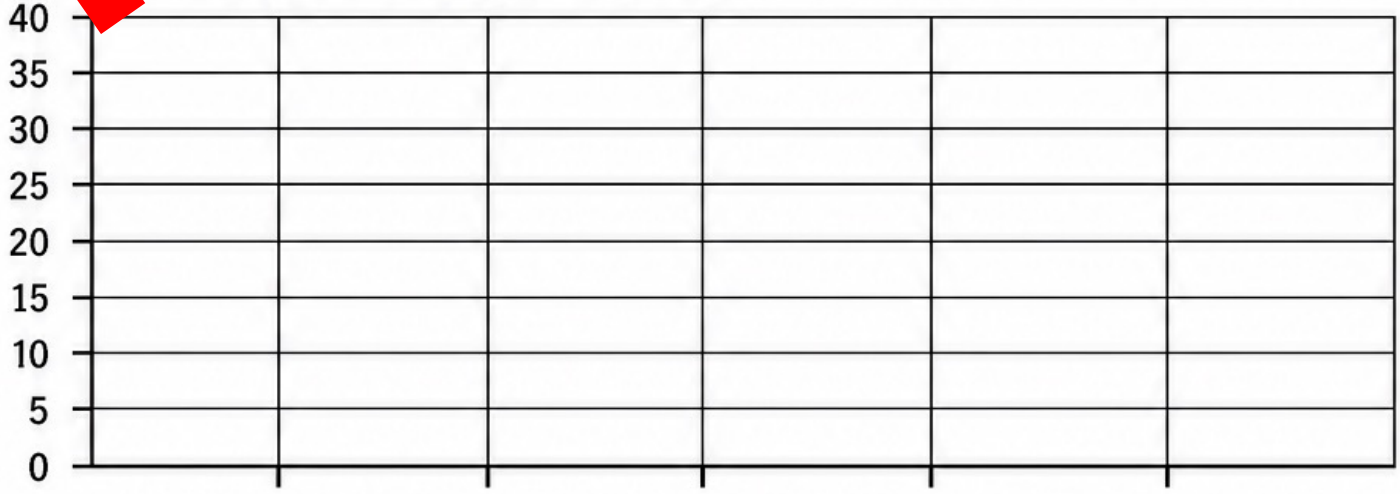
_____

3. [illegible]ar t[illegible] and vert[illegible]-axis label.

[illegible]itle: _____

[illegible]-axis label: _____

4. Rec[illegible] the graph correctly on the grid below.



Name: ANSWERS

REPAIR THE GRAPH

FIND, EXPLAIN, IMPROVE

A student made this graph about canteen sales.

Actual sales: Fruit 20, Sandwiches 35, Muffins 25, Yoghurt 10.

1. List four problems with this graph.

1. No graph title.
2. No vertical-axis label.
3. The vertical scale is uneve
4. The bars have unequa ths.

2. Explain how on lem mislead reader.

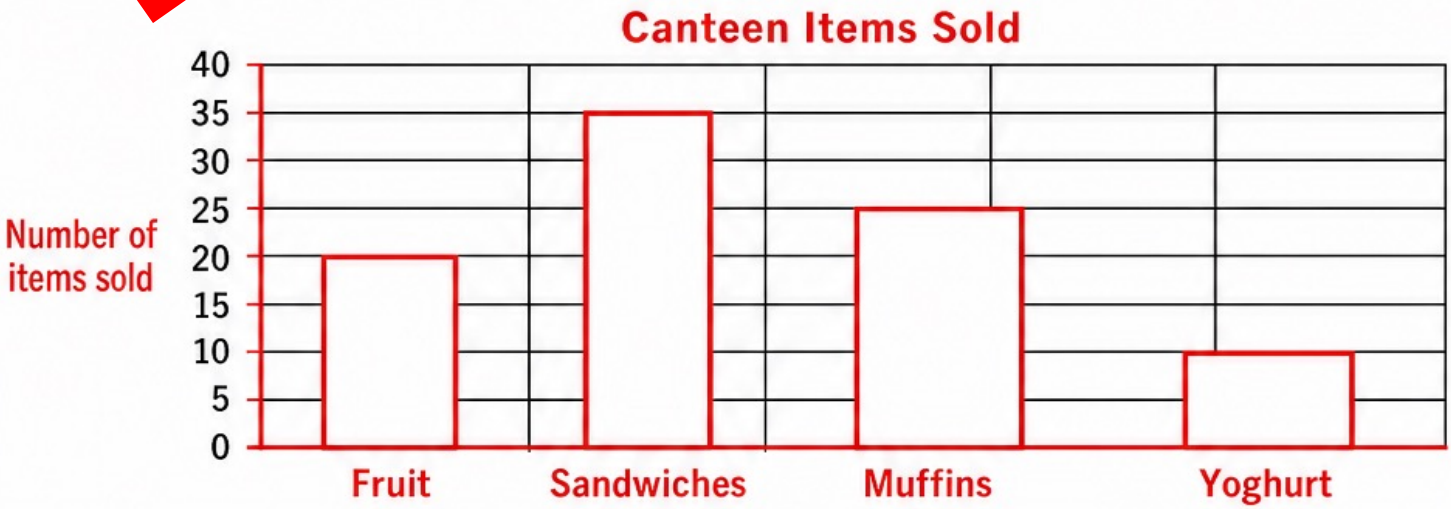
The uneven ale ma s diff ok larger or smaller than they are.

3. ar t and vert al-axis label.

itle: nteen ems Sold

al-axis label: Number of items sold

4. Red the graph correctly on the grid below.



Name: _____

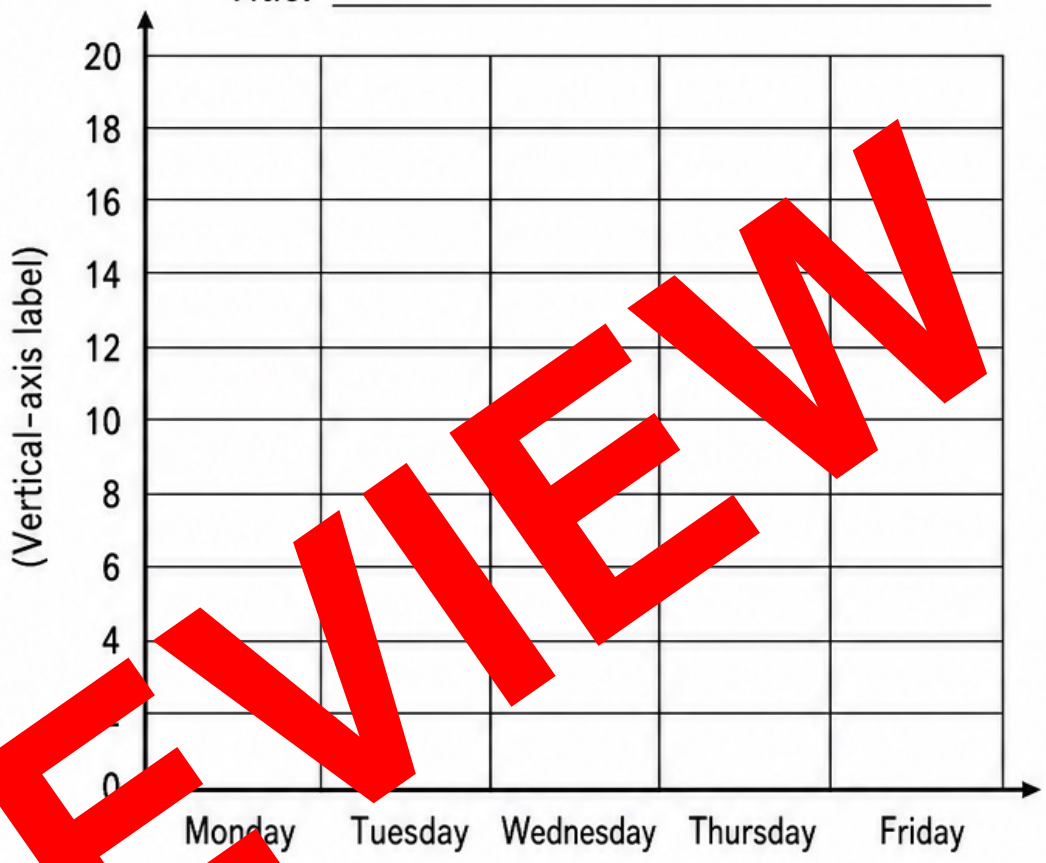
CREATE A COLUMN GRAPH

LIBRARY VISITS

The class counted visits to the library during one school week.

Day	Visits
Monday	12
Tuesday	15
Wednesday	9
Thursday	18
Friday	14

Title: _____



1. Which [illegible] had th[illegible]ost vi[illegible]

_____

How [illegible]ny vi[illegible] were recorded altogether?

_____

3. H[illegible] many more visits were recorded on Thursday than Wednesday?

_____

4. Write one statement comparing Tuesday and Friday.

_____

_____

5. Explain why the scale is suitable.

_____

_____

Name: ANSWERS

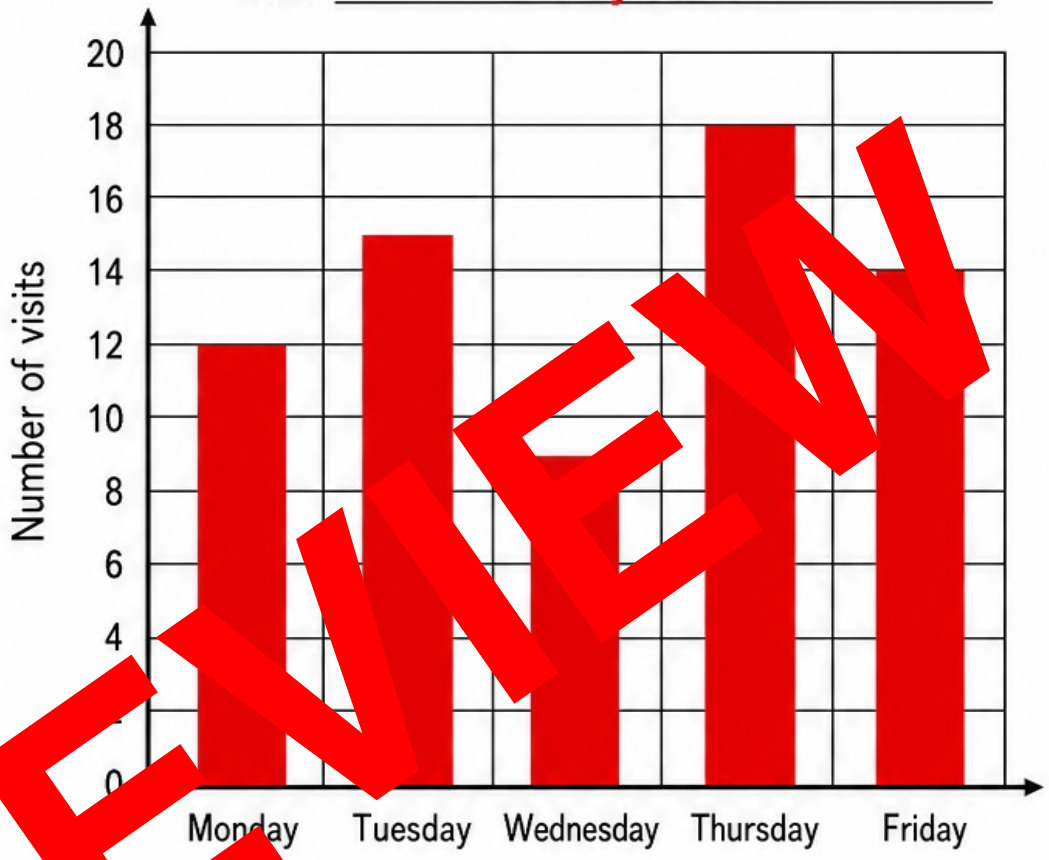
CREATE A COLUMN GRAPH

LIBRARY VISITS

The class counted visits to the library during one school week.

Day	Visits
Monday	12
Tuesday	15
Wednesday	9
Thursday	18
Friday	14

Title: Library Visits



1. Which [illegible] had th[illegible]ost vi[illegible]
Th[illegible]sday

How [illegible]ny vi[illegible] were recorded altogether?

3. H[illegible] many more visits were recorded on Thursday than Wednesday?
9

4. Write one statement comparing Tuesday and Friday.
Tuesday had 1 more visit than Friday.

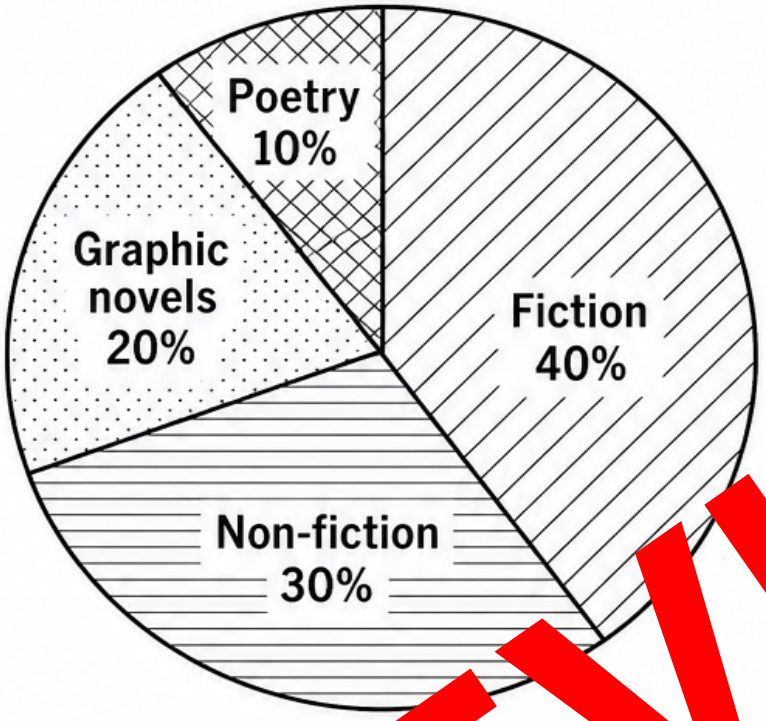
5. Explain why the scale is suitable.
The even scale of 2 reaches above the maximum value of 18.

Name: _____

PARTS OF A WHOLE

READ A PIE CHART

Forty students chose their favourite reading type.



Fiction 40%

Graphic n 20%

Po y 10%

1. Which choice was m t popul r?

_____

2. What p ntag hose t

_____

3. Wha acti f the class chose Graphic novels?

_____

4. H many students chose Fiction?

_____

5. How many chose Non-fiction?

_____

6. How many more chose Fiction than Poetry?

_____

7. Check that the percentages make one whole.

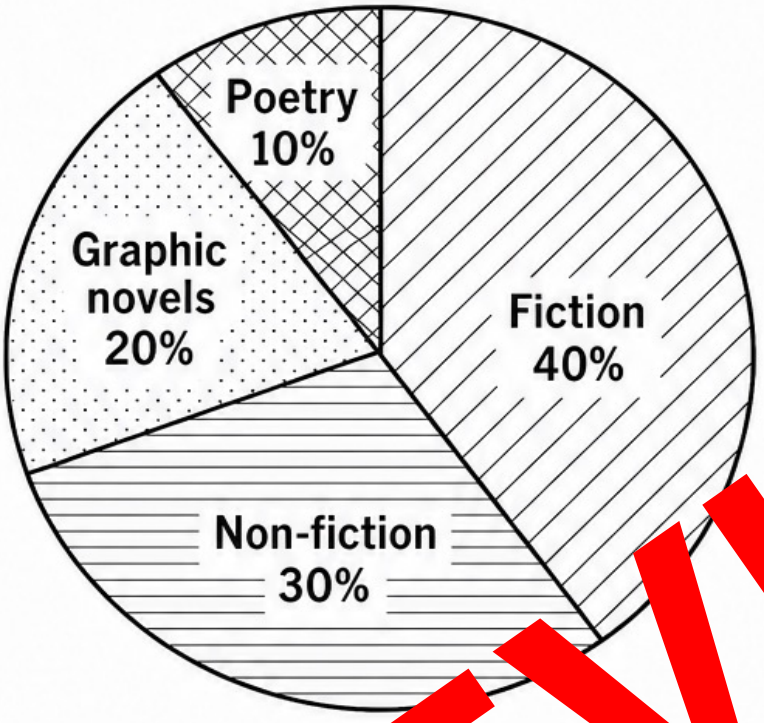
_____

Name: ANSWERS

PARTS OF A WHOLE

READ A PIE CHART

Forty students chose their favourite reading type.



Fiction 40%

Graphic n 20%

10%

1. Which choice was most popular?
   Fiction

2. What percentage chose it?
   10%

3. What fraction of the class chose Graphic novels?
   1/

4. How many students chose Fiction?
   students

5. How many chose Non-fiction?
   12 students

6. How many more chose Fiction than Poetry?
   12 more students

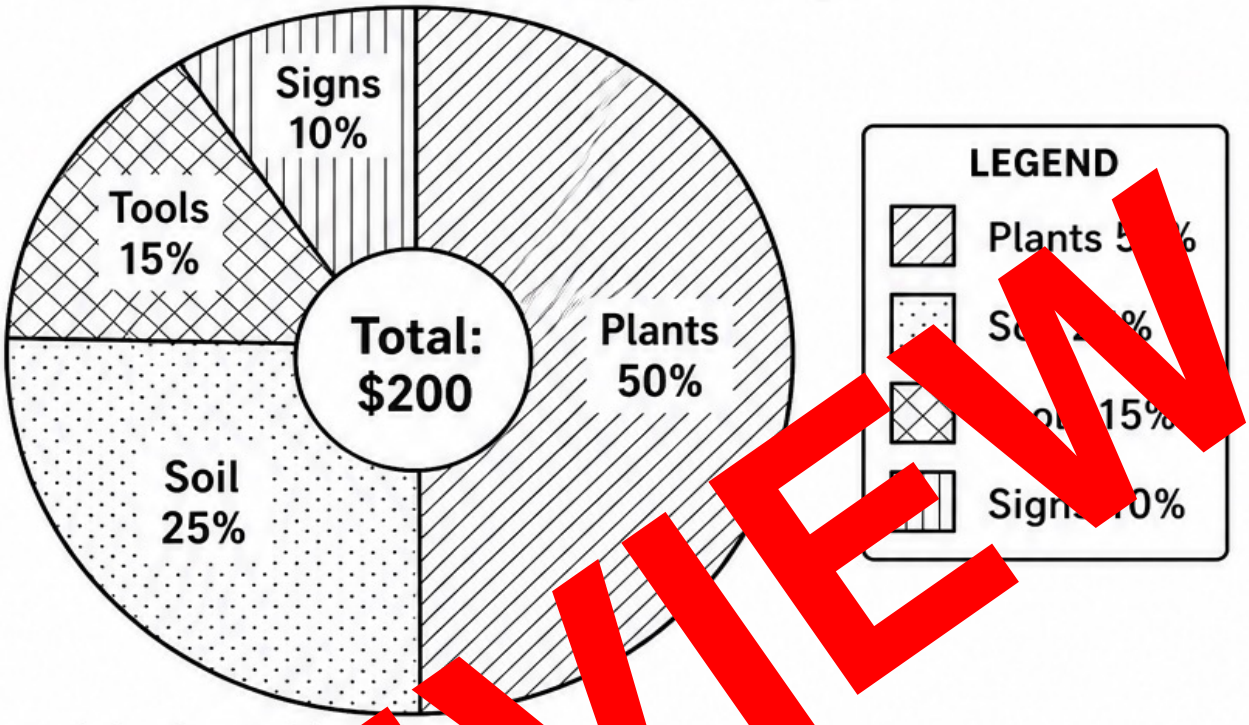
7. Check that the percentages make one whole.
   40% + 30% + 20% + 10% = 100%, which is one whole.

Name: _____

PARTS OF A WHOLE

PLAN A GARDEN BUDGET

A class has $200 to improve its garden.



1. How much is planned for Plants?

   _____

2. How much is planned for Soil?

   _____

3. How much is planned for Tools?

   _____

4. How much is planned for Signs?

   _____

5. How much more is planned for Plants than Tools?

   _____

6. If $20 moves from Plants to Signs, write the new dollar amounts and percentages for those two categories.

   Plants: $_____ (_____%)

   Signs: $_____ (_____%)

7. Explain one advantage of a doughnut chart for this budget.

   _____

   _____

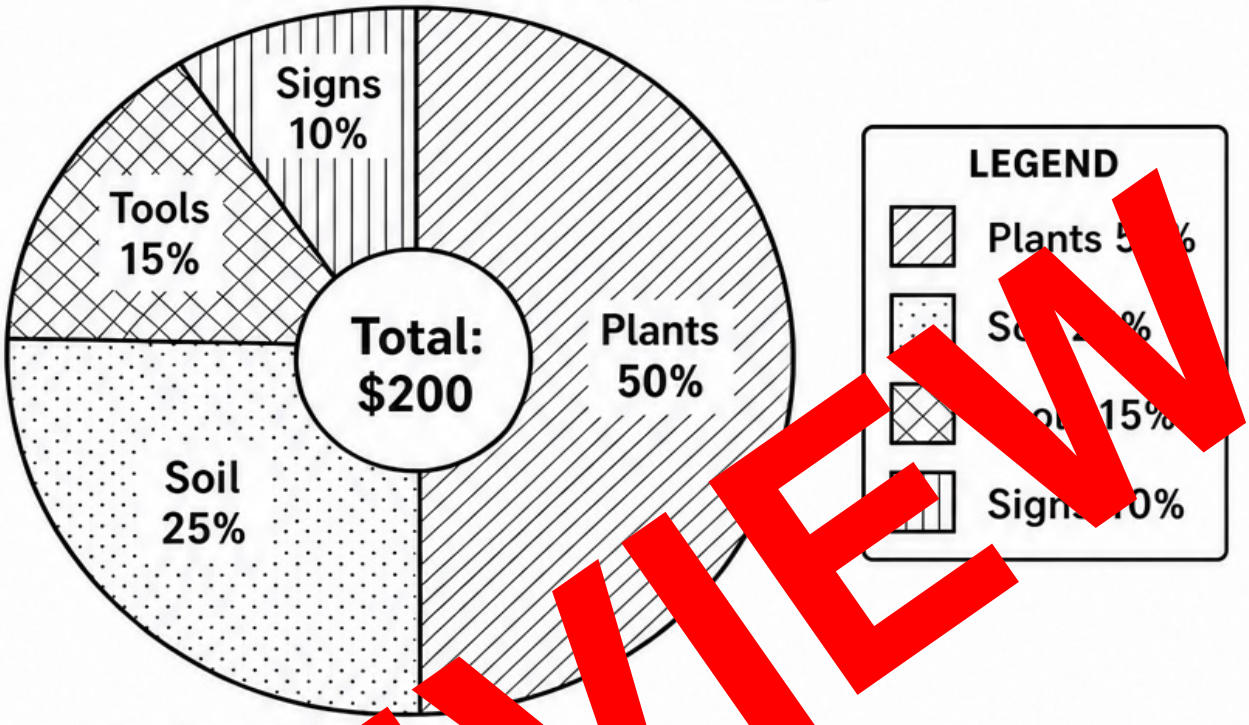
   _____

Name: ANSWERS

PARTS OF A WHOLE

PLAN A GARDEN BUDGET

A class has $200 to improve its garden.



1. How much is planned for Plants?
   $100

2. How much is planned for Soil?
   $50

3. How much is planned for Tools?
   $30

4. How much is planned for Signs?
   $20

5. How much more is planned for Plants than Tools?
   $70

6. If $20 moves from Plants to Signs, write the new dollar amounts and percentages for those two categories.

   Plants: $ 80 (40 %)

   Signs: $ 40 (20 %)

7. Explain one advantage of a doughnut chart for this budget.
   It clearly shows each category as a proportion of the whole $200 budget.

Name: _____ Date: _____

SCHOOL GARDEN DATA INVESTIGATION

Assessment — Part A: Organise and Display

Thirty Year 4 students voted for the feature they most want in a new school garden.

Feature	Number of votes
Vegetable beds	9
Native flowers	8
Herb garden	7
Shade trees	6

1. Is this categorical or discrete numerical data? Explain.

_____

_____

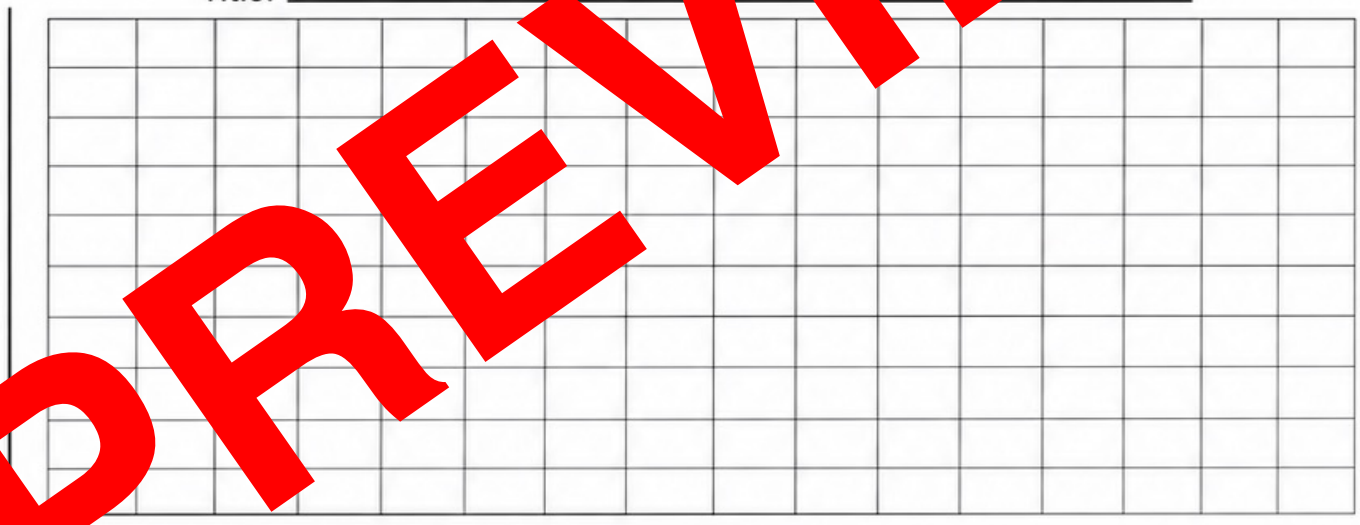
2. Choose a suitable data display. Name it and explain your choice.

_____

_____

3. Create your data display here.

Title: _____



bel for vertical axis:

Label for horizontal axis: _____

Key (used): _____

Scale: _____

4. Which feature was most popular? _____

5. How many more students chose Vegetable beds than Shade trees? _____

6. Write one accurate conclusion supported by the data.

_____

_____

Check: title • labels • even scale or clear key • accurate values

Name: ANSWERS Date: _____

SCHOOL GARDEN DATA INVESTIGATION

Assessment — Part A: Organise and Display

Thirty Year 4 students voted for the feature they most want in a new school garden.

Feature	Number of votes
Vegetable beds	9
Native flowers	8
Herb garden	7
Shade trees	6

1. Is this categorical or discrete numerical data? Explain.

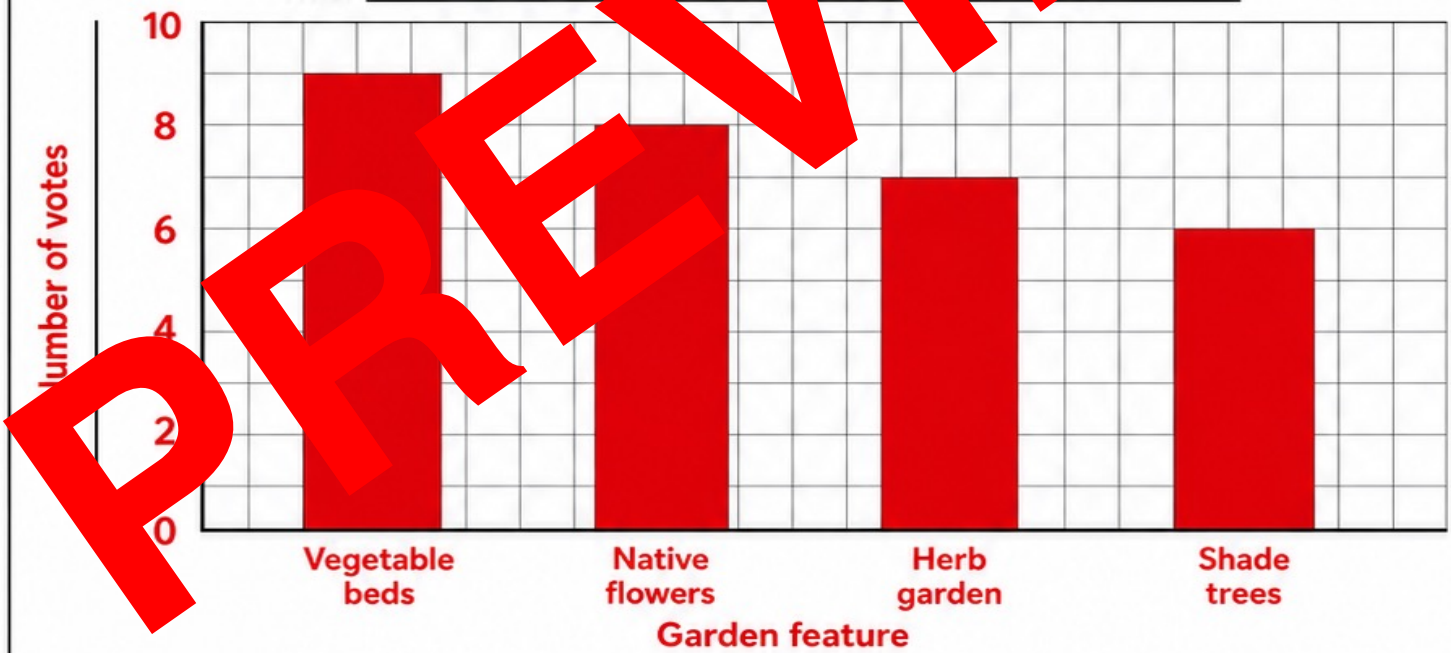
Categorical data, because the responses are named garden features

2. Choose a suitable data display. Name it and explain your choic

A column graph, because it compares counts acr categ s clearly

3. Create your data display here.

Title: Favourite School arde eat s



Label for horizontal axis: Garden feature

Key (if used): _____

Scale: 0 to 10 in steps of 2

4. Which feature was most popular? Vegetable beds

5. How many more students chose Vegetable beds than Shade trees? 3

6. Write one accurate conclusion supported by the data.

Votes decrease by one from Vegetable beds to Shade trees.

Check: title • labels • even scale or clear key • accurate values

Name: _____ Date: _____

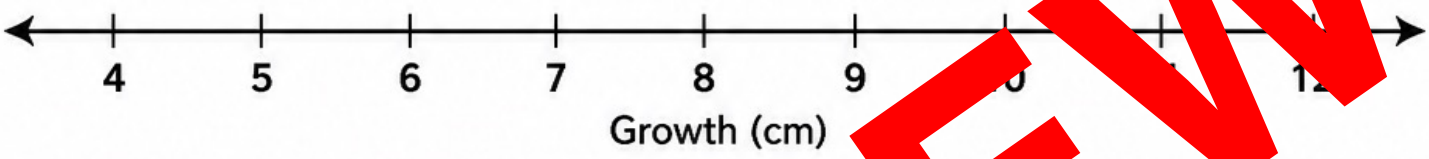
SCHOOL GARDEN DATA INVESTIGATION

Assessment — Part B: Distribution and Decisions

Nine sunflower seedlings grew by these amounts in one week (cm):

4, 5, 5, 6, 6, 6, 7, 7, 12

1. Create a dot plot for the growth data.



2. State the range. _____

3. Where does the data cluster? _____

4. Identify any gap or outli _____

5. A second grou orde 4, 5, 6, 7, 8, 10, 12, 14.
Which gr has g ter v tio se ranges to justify your answer.

_____

_____

_____

6. A dent says, 'Most seedlings grew 12 cm because 12 is the largest number.'
Is th correct? Explain using the distribution.

_____

_____

_____

_____

7. Suggest one useful next question the class could investigate about the garden.

_____

_____

Name: ANSWERS Date: _____

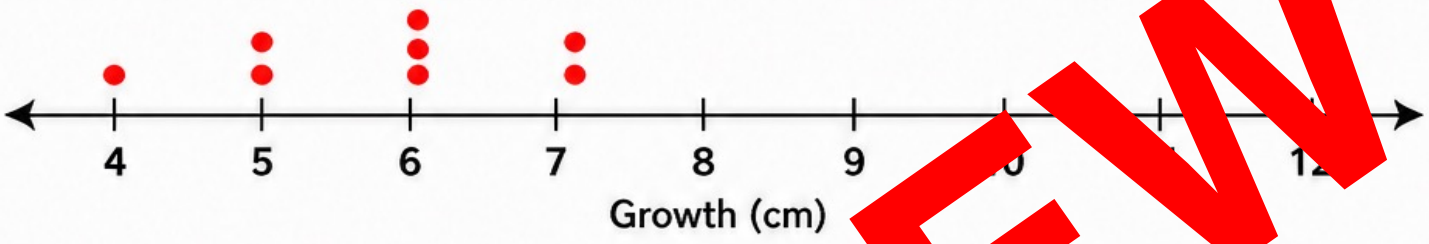
SCHOOL GARDEN DATA INVESTIGATION

Assessment — Part B: Distribution and Decisions

Nine sunflower seedlings grew by these amounts in one week (cm):

4, 5, 5, 6, 6, 6, 7, 7, 12

1. Create a dot plot for the growth data.



2. State the range. 8 cm

3. Where does the data cluster? 5–7 cm

4. Identify any gap or outlier. Gap: 8–12 cm; outlier: 12 cm.

5. A second group recorded 4, 5, 6, 7, 8, 10, 12, 14.
Which group has greater variation? Use ranges to justify your answer.
The second group has greater variation. Its range is 14 – 2 = 12 cm; the first group's range is 12 – 4 = 8 cm.

6. A student says, 'Most seedlings grew 12 cm because 12 is the largest number.'
Is this correct? Explain using the distribution.
No. Most values cluster from 5 to 7 cm; 6 cm occurs most often. The 12 cm value occurs once and is an outlier.

7. Suggest one useful next question the class could investigate about the garden.
Does the amount of sunlight affect sunflower growth?

DATA DISPLAYS — ASSESSMENT RUBRIC

School Garden Data Investigation • Year 4

Student: _____ **Date:** _____ **Teacher:** _____

Criterion	BEGINNING	DEVELOPING	ACHIEVING	CONFIDENT	EXCEEDING	Score
1. Organises data	Needs support to organise or classify data.	Organises some data but errors affect clarity.	Organises the data with generally accurate classification.	Organises all data accurately and identifies its type.	Organises and classifies data accurately, efficiently and independently.	/ 5
2. Creates data displays	Display is incomplete or unsuitable.	Display is partly correct but misses key features.	Uses a suitable display with title, labels and mostly accurate values.	Creates accurate displays with a suitable scale or key.	Creates precise, polished displays and justifies design choices.	/ 5
3. Interprets distributions	Needs support to interpret the distribution.	Identifies some features with limited explanation.	Identifies range, cluster and obvious gaps or outliers.	Explains range, cluster, gap, outlier and variation correctly.	Compares distributions insightfully using precise evidence.	/ 5
4. Reasons with evidence	Reasoning is unclear or unsupported.	Gives a conclusion with limited evidence.	Uses relevant data to support a clear conclusion.	Justifies choices and conclusions with accurate evidence.	Connects multiple pieces of evidence in a convincing argument.	/ 5
5. Mathematical communication	Communication is difficult to follow.	Meaning is partly clear; errors remain.	Uses suitable vocabulary and mostly accurate calculations.	Uses precise vocabulary, accurate calculations and clear presentation.	Communicates complex reasoning clearly, precisely and efficiently.	/ 5

Total: _____ / 25

Teacher feedback:

_____

_____

_____

Next step: _____

Data Displays

Data Displays Quiz