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Year 6 Data and Statistics

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DATA TYPES AT A GLANCE

NOMINAL	categorical	Names or groups with no natural order.		Example: favourite lunch	ASK: Which group?
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ORDINAL	categorical	Categories with a meaningful order.		Example: satisfaction rating	ASK: Which rank?
----------------	-------------	-------------------------------------	--	------------------------------	-------------------------

DISCRETE	numerical	Counted values that are separate.		Example: number of blocks	ASK: How many?
-----------------	-----------	-----------------------------------	---	---------------------------	-----------------------

CONTINUOUS	numerical	Measured values within a range.		Example: plant height	ASK: How much?
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WHICH DATA TYPE?

Follow the question pathway.

Does the answer describe a group or a number?

GROUP

Is there a meaningful order?

NO → NOMINAL



favourite sport

YES → ORDINAL



confidence rating

NUMBER

Is it counted or measured?

COUNTED → DISCRETE



number of goals

MEASURED → CONTINUOUS



running time



VARIABLE = what changes



VALUE = the recorded answer



Always explain how you know.



DATA QUESTION SORT



Place each question in the matching variable-type zone. Be ready to explain your choice.

NOMINAL

categorical

► groups with no order



DISCRETE

numerical

► counted values



ORDINAL

categorical

► groups with an order



CONTINUOUS

numerical

► measured values



DATA QUESTION SORT – CARDS

Cut out the cards. Sort each card by the type of variable it would produce.

1. What is your favourite music genre?



2.

How many different heights do you feel: low, medium or high?



3.

How many siblings do you have?



4.

What is your hand span in centimetres?



5.

Which type of pet do you prefer?



6.

What place did you finish: 1st, 2nd, 3rd or 4th?



9.

What is your eye colour?



10.

How many stars would you give the excursion: 1 to 5?



11.

How many goals did your team score?



12.

How long does your trip to school take in minutes?



13.

Which lunch option would you choose?



14.

Is your reading fluency developing, secure or advanced?



15.

How many days were you absent this term?



16.

What was the air temperature at noon in °C?



DATA QUESTION SORT – ANSWER KEY



Use the variables produced by each question.

NOMINAL	ORDINAL	DISCRETE	CONTINUOUS
groups with no order	groups with an order	counted values	measured values
			
1, 5, 9, 13	2, 6, 10, 14	3, 7, 11, 15	4, 8, 12, 16
 music genre • pet type • eye colour • lunch choice	 confidence • place • star rating • reading fluency	 siblings • books • goals • percent of	 hand span • volume • travel time • temperature



A strong explanation names whether the answer is a group or number, then explains whether it is ordered, counted or measured.



GRAPH MATCH-UP – CARDS A-D

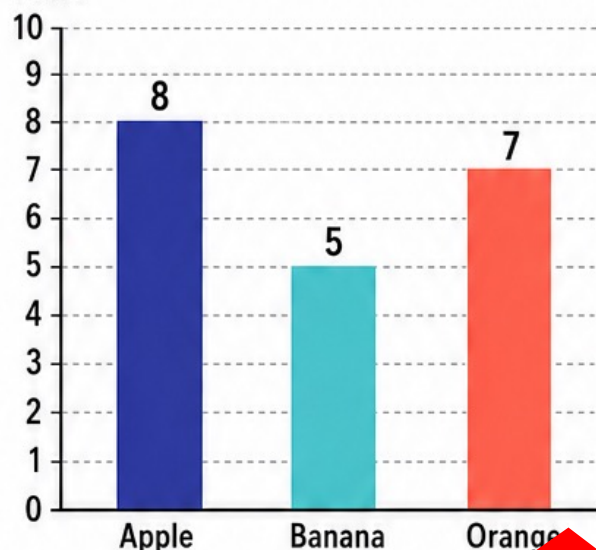


Read each display. Record your answer and evidence.

A

FRUIT VOTES

Votes



Which fruit had the most votes?
How many more than the least?

B

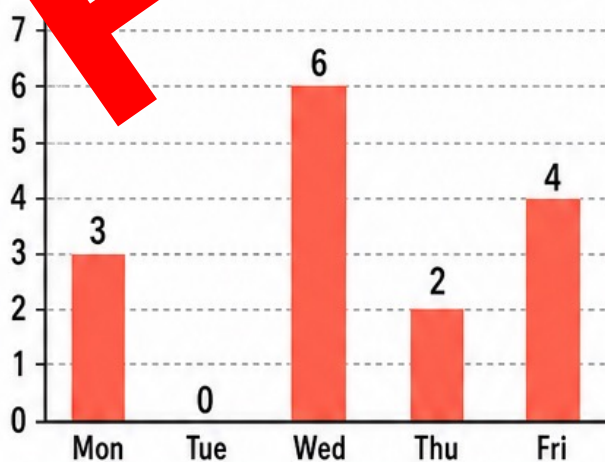
BOOKS READ



What are the mode and range?

C

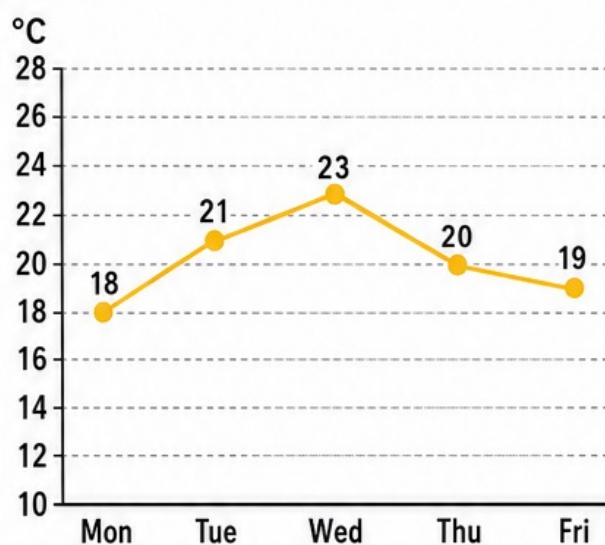
RAINFALL



What was the total rainfall?
Which day was wettest?

D

NOON TEMPERATURE

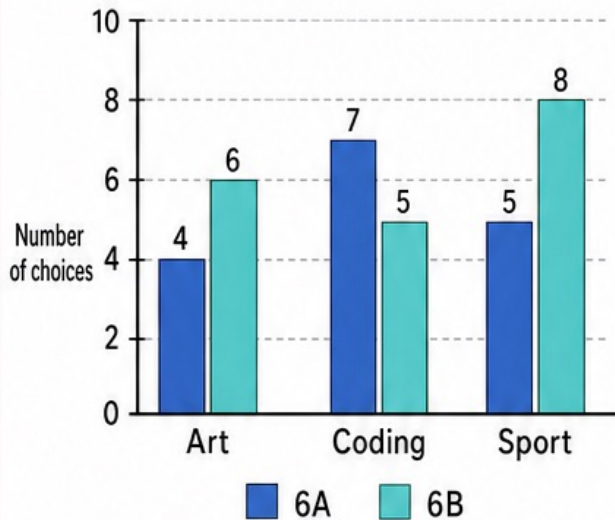


What was the highest temperature?
What was the change from
Wednesday to Friday?

GRAPH MATCH-UP – CARDS E-H

Read each display. Record your answer and evidence.

E CLUB CHOICES



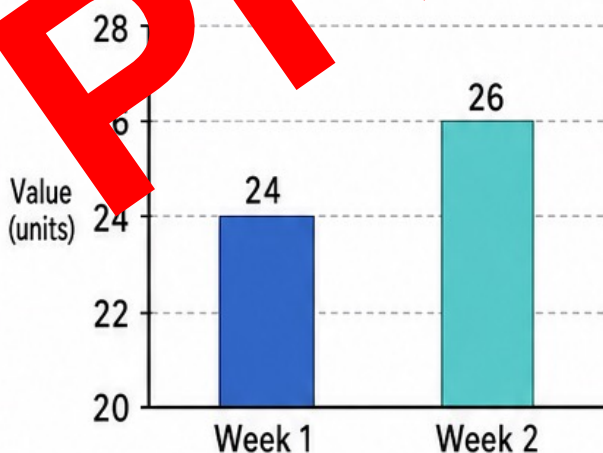
Which class had more sport choices?
By how many?

F LAP TIMES



Which team was more consistent?
Use the range as evidence.

G A BIG DIFFERENCE?



Why could this display exaggerate the change?

H PLANT HEIGHTS

Plant	Height (cm)
Sunflower	45
Bean	32
Pea	28
Tomato	38

What is the range?
What type of variable is height?

GRAPH MATCH-UP – RECORDING SHEET

Name: _____

Date: _____

For each card, record your answer and the data evidence that supports it.

A

Answer: _____

Evidence: _____

B

Answer: _____

Evidence: _____

C

Answer: _____

Evidence: _____

D

Answer: _____

Evidence: _____

E

Answer: _____

Evidence: _____

F

Answer: _____

Evidence: _____

G

Answer: _____

Evidence: _____

H

Answer: _____

Evidence: _____

Evidence may include a value, calculation, comparison or feature of the display.

GRAPH MATCH-UP – RECORDING SHEET

Name: ANSWERS

Date: _____

For each card, record your answer and the data evidence that supports it.

A

Answer: Apple; 3 more.

Evidence: $8 - 5 = 3$.

B

Answer: Mode = 3; range = 4.

Evidence: 3 occurs three times; $4 - 1 = 4$.

C

Answer: 15 mm; Wednesday.

Evidence: $3 + 0 + 6 + 2 + 4 = 15$; Wed = 6 mm.

D

Answer: 5°C; a decrease of 4°C.

Evidence: $23 - 19 = 4$.

E

Answer: Class 6B; 5 more.

Evidence: $10 - 5 = 5$.

F

Answer: Red team.

Evidence: Red range = 3; Blue range = 6.

G

Answer: The vertical axis starts at 20.

Evidence: A 2-unit change looks much larger.

H

Answer: 17 cm; continuous numerical.

Evidence: $45 - 28 = 17$; height is measured.

Evidence may include a value, calculation, comparison or feature of the display.

CLASSIFYING VARIABLES

Page 1 — Core Practice

Name: _____

Date: _____

For each survey question, write the broad type and the most specific subtype.

Broad type: categorical or numerical

Subtype: nominal, ordinal, discrete or continuous

Survey question	Broad type	Subtype
1. What is your favourite library section?		
2. Rate your reading enjoyment: low, medium or high.		
3. How many times did you visit the library this month?		
4. How many minutes did you spend reading last night?		
5. Which type of drink do you prefer?		
6. What did you finish in the run race?		
7. How many steps did you take today?		
8. What is the mass of your backpack in kilograms?		

Choose one row. Explain how you know:

CLASSIFYING VARIABLES

Page 1 — Core Practice

Name: **ANSWERS**

Date: _____

For each survey question, write the broad type and the most specific subtype.

Broad type: categorical or numerical

Subtype: nominal, ordinal, discrete or continuous

Survey question	Broad type	Subtype
1. What is your favourite library section?	Categorical	Nominal
2. Rate your reading enjoyment: low, medium or high.	Categorical	Ordinal
3. How many times did you visit the library this month?	Numerical	Discrete
4. How many minutes did you spend reading last night?	Numerical	Continuous
5. Which type of drink do you prefer?	Categorical	Nominal
6. What did you finish in the run?	Categorical	Ordinal
7. How many steps did you take today?	Numerical	Discrete
8. What is the mass of your backpack in kilograms?	Numerical	Continuous

Choose one row. Explain how you know:

Example, row 8: mass is a number found by measuring. It can take any value within a range, so it is continuous numerical data.

CLASSIFYING VARIABLES

Page 2 — Reasoning Challenge

Name: _____

Date: _____

A. CLASSIFY AND JUSTIFY

Name the subtype, then explain the clue that proves it.

1. Which school house are you in?

Subtype: _____

Clue: _____

2. Which medal level did you earn: bronze, silver or gold?

Subtype: _____

Clue: _____

3. How many goals were scored?

Subtype: _____

Clue: _____

4. What was the reaction time in seconds?

Subtype: _____

Clue: _____

B. IMPROVE THE QUESTION

“Do you like mathematics?”

Revise the question so it produces ordinal data with at least four ordered response options.

C. CREATE YOUR OWN

Write one clear survey question for each subtype.

Nominal

Ordinal

Discrete

Continuous

CLASSIFYING VARIABLES

Page 2 — Reasoning Challenge

Name: ANSWERS

Date: _____

A. CLASSIFY AND JUSTIFY

Name the subtype, then explain the clue that proves it.

1. Which school house are you in?

Subtype: Nominal

Clue: School houses are groups with no natural order.

2. Which medal level did you earn: bronze, silver or gold?

Subtype: Ordinal

Clue: Bronze, silver and gold have a meaningful rank.

3. How many goals were scored?

Subtype: Discrete

Clue: Goals are counted in whole numbers.

4. What was the reaction time in seconds?

Subtype: Continuous

Clue: Reaction time is a measurement and may include decimals.

B. IMPROVE THE QUESTION

"Do you like mathematics?"

Revise the question so it produces ordinal data with at least four ordered response options.

How much do you enjoy mathematics? Choose: not yet, a little, quite a lot or very much.

C. CREATE YOUR OWN

Write one clear survey question for each subtype.

Nominal

Which fruit do you prefer?

Ordinal

Rate the school day: poor, fair, good or excellent.

Discrete

How many books did you read?

Continuous

What is your height in centimetres?

READING COMPARATIVE DISPLAYS

Page 1 — Library Visits

Name: _____

Date: _____

Use the grouped bar chart to answer each question. Show calculations where needed.



1. Which class had more visits on Monday? By how many?

2. How many visits were recorded altogether on Friday?

3. Which day had the greatest combined number of visits? Show how you know.

4. For 6B, how did Tuesday compare with Thursday?

5. Write one other true comparison supported by the chart.

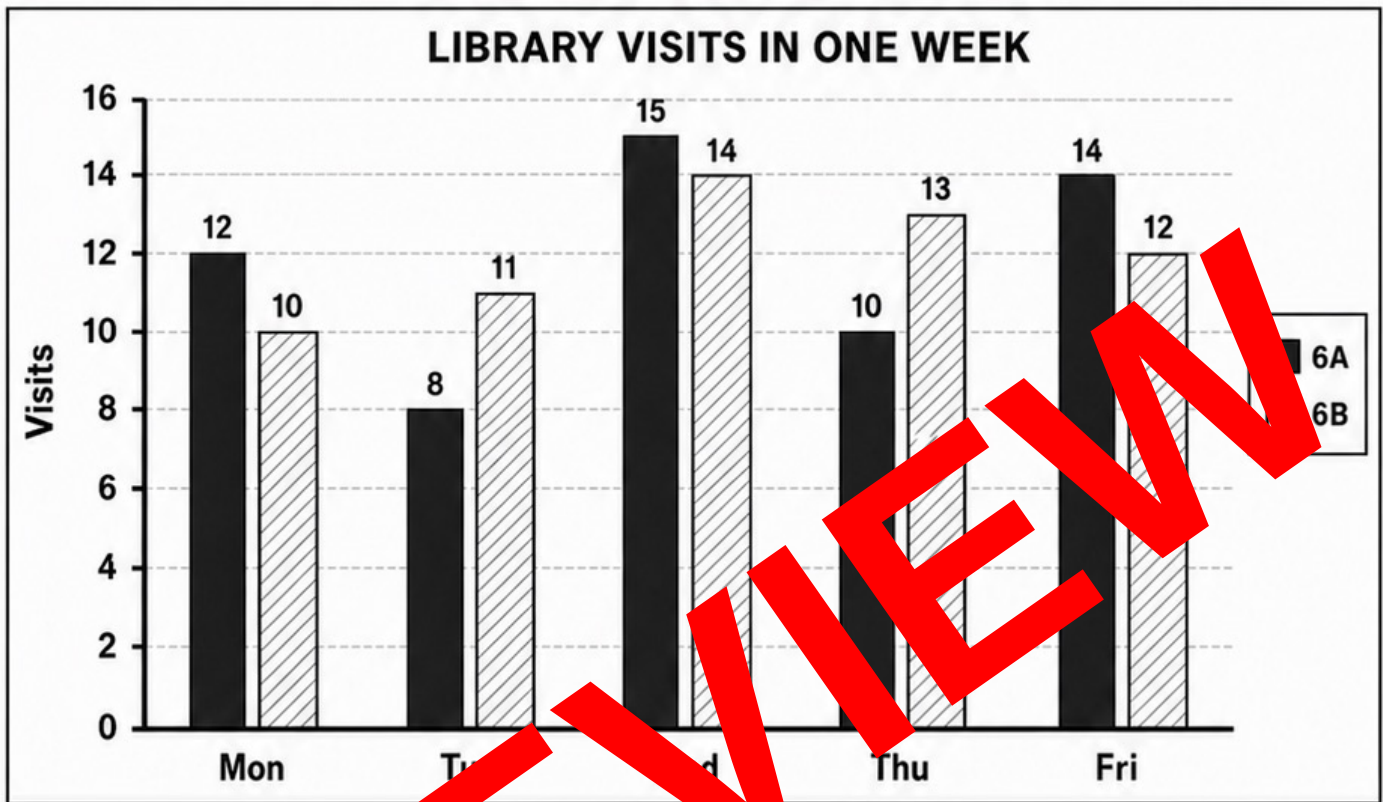
READING COMPARATIVE DISPLAYS

Page 1 — Library Visits

Name: **ANSWERS**

Date: _____

Use the grouped bar chart to answer each question. Show calculations where needed.



1. Which class had more visits on Monday? By how many?

6A, by 2 visits. $12 - 10 = 2$.

2. How many visits were recorded altogether on Friday?

26 visits. $14 + 12 = 26$.

3. Which day had the greatest combined number of visits? Show how you know.

Wednesday. $15 + 14 = 29$ visits.

4. For 6B, how did Tuesday compare with Thursday?

Thursday had 2 more visits than Tuesday. $13 - 11 = 2$.

5. Write one other true comparison supported by the chart.

Example: 6A had more visits than 6B on Monday and Friday.

READING COMPARATIVE DISPLAYS

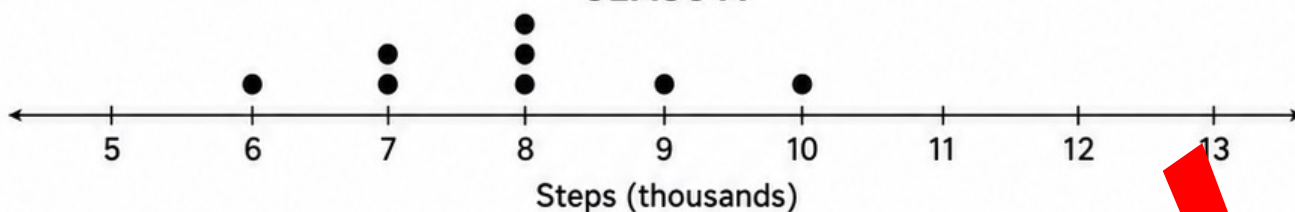
Page 2 — Step Counts

Name: _____

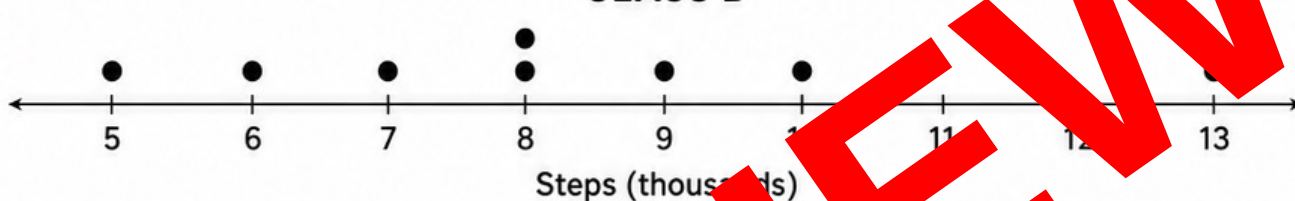
Date: _____

Each dot represents one daily step count. Values are in thousands of steps.

CLASS A



CLASS B



1. What is the mode for each class?

2. What is the range for each class? Show both calculations.

3. What is the most cluster for class A?

4. Which class is more consistent? Use the range as evidence.

5. Describe one gap or outlier in Class B.

6. Write one sentence comparing the shapes of the two distributions.

READING COMPARATIVE DISPLAYS

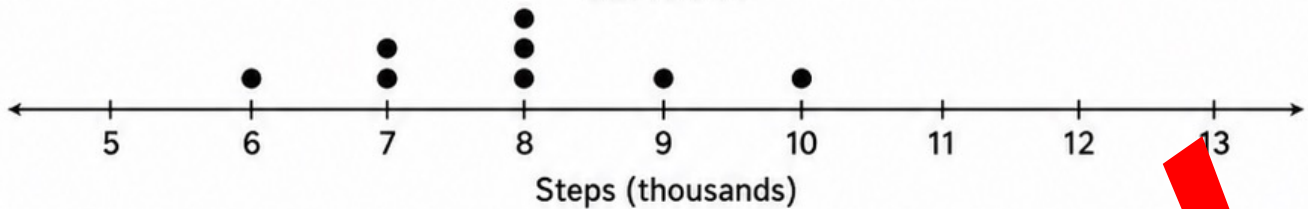
Page 2 — Step Counts

Name: **ANSWERS**

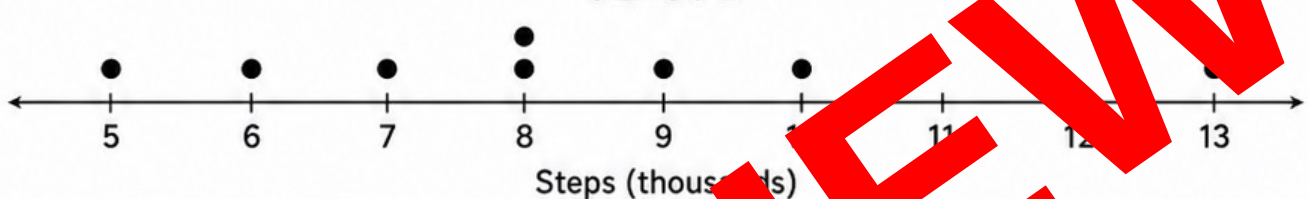
Date: _____

Each dot represents one daily step count. Values are in thousands of steps.

CLASS A



CLASS B



1. What is the mode for each class?

Class A mode = 8; Class B mode = 8.

2. What is the range for each class? Show both calculations.

Class A: $10 - 6 = 4$; Class B: $13 - 5 = 8$.

3. Where is the main cluster for Class A?

The main Class A cluster is from 7 to 9 thousand steps.

4. Which class is more consistent? Use the range as evidence.

Class A is more consistent: its range is 4, compared with 8 for Class B.

5. Describe one gap or outlier in Class B.

Class B has no values at 11 or 12, then a possible outlier at 13.

6. Write one sentence comparing the shapes of the two distributions.

Class A is tightly clustered around 8; Class B is more spread out with a right-hand tail.

MODE, RANGE AND SHAPE

Page 1 — Build the Evidence

Name: _____

Date: _____

For each data set: order the values, find the mode and range, then describe one feature of the shape.

MODE = most frequent

RANGE = maximum – minimum

SHAPE = clusters, gaps, peaks or outliers

DATA SET A

7, 4, 5, 8, 7, 6, 5, 7

Ordered values: _____

Mode: _____

Range calculation: _____

One feature of the shape: _____

DATA SET B

10, 2, 3, 3, 6, 1

Ordered values: _____

Mode: _____

Range calculation: _____

One feature of the shape: _____

DATA SET C

15, 12, 18, 14, 16, 13, 17

Ordered values: _____

Mode: _____

Range calculation: _____

One feature of the shape: _____

CHALLENGE: Which data set is most spread out? Use the ranges as evidence.

MODE, RANGE AND SHAPE

Page 1 — Build the Evidence

Name: **ANSWERS**

Date: _____

For each data set: order the values, find the mode and range, then describe one feature of the shape.

MODE = most frequent

RANGE = maximum – minimum

SHAPE = clusters, gaps, peaks or outliers

DATA SET A

7, 4, 5, 8, 7, 6, 5, 7

Ordered values: **4, 5, 5, 6, 7, 7, 7, 8**

Mode: **7**

Range calculation: **$8 - 4 = 4$**

One feature of the shape: **Most values cluster from 5 to 7, with a peak at 7.**

DATA SET B

10, 2, 5, 3, 4, 6, 7

Ordered values: **2, 2, 3, 4, 5, 6, 7, 10**

Mode: **2**

Range calculation: **$10 - 2 = 8$**

One feature of the shape: **There is a gap from 7 to 9 and a possible outlier at 10.**

DATA SET C

15, 12, 18, 14, 16, 13, 17

Ordered values: **12, 13, 14, 15, 16, 17, 18**

Mode: **No mode**

Range calculation: **$18 - 12 = 6$**

One feature of the shape: **The values are evenly spread with no gaps.**

CHALLENGE: Which data set is most spread out? Use the ranges as evidence.

Data Set B is most spread out because its range of 8 is greater than 4 and 6.

MODE, RANGE AND SHAPE

Page 2 — Same Centre, Different Spread

Name: _____

Date: _____

Two teams recorded points across five rounds. Compare what the summary statistics reveal—and what they can hide.

MEDIAN = middle ordered value

MEAN = total $\div$ number of values

TEAM NORTH

4, 5, 5, 6, 7

Mode: _____

Median: _____

Mean: _____

Range: _____

TEAM SOUTH

1, 5, 5, 5, 11

Mode: _____

Median: _____

Mean: _____

Range: _____

1. Show the mean calculation for each team.

2. Which summary statistics are the same for both teams?

3. How do the ranges differ?

4. Describe one difference in the shape or spread of the two distributions.

5. Which team was more consistent? Explain using evidence.

Why is it risky to compare two data sets using only one statistic?

MODE, RANGE AND SHAPE

Page 2 — Same Centre, Different Spread

Name: ANSWERS

Date: _____

Two teams recorded points across five rounds. Compare what the summary statistics reveal—and what they can hide.

MEDIAN = middle ordered value

MEAN = total ÷ number of values

TEAM NORTH

4, 5, 5, 6, 7

Mode: 5

Median: 5

Mean: 5.4

Range: 3

TEAM SOUTH

1, 5, 5, 5, 11

Mode: 5

Median: 5

Mean: 5.4

Range: 10

1. Show the mean calculation for each team.

North: $(4 + 5 + 5 + 6 + 7) \div 5 = 27 \div 5 = 5.4$ South: $(1 + 5 + 5 + 5 + 11) \div 5 = 27 \div 5 = 5.4$

2. Which summary statistics are the same for both teams?

Both teams have mode 5, median 5 and mean 5.4.

3. How do the ranges differ?

North range = $7 - 4 = 3$; South range = $11 - 1 = 10$. The difference is 7.

4. Describe one difference in the shape or spread of the two distributions.

North is tightly clustered from 4 to 7; South has extreme values at 1 and 11.

5. Which team was more consistent? Explain using evidence.

Team North is more consistent because its range is much smaller: 3 compared with 10.

Why is it risky to compare two data sets using only one statistic?

One statistic can hide differences in spread, shape, gaps or unusual values.

Compare several features.

COMPARING DATA SETS

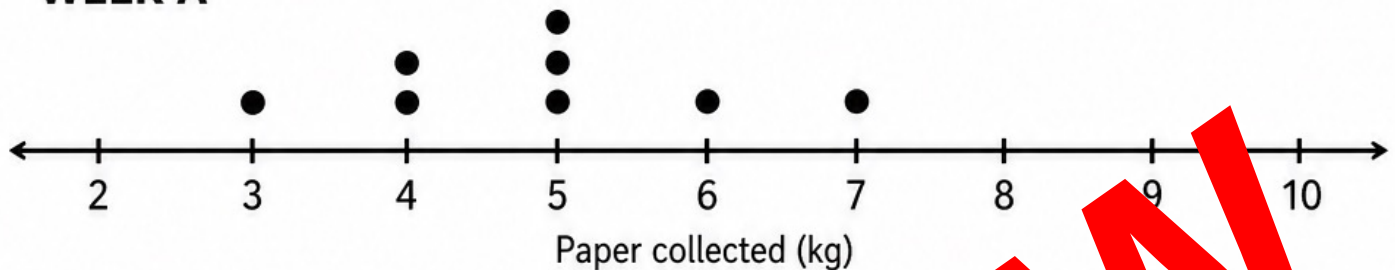
Page 1 — Recycling Weights

Name: _____

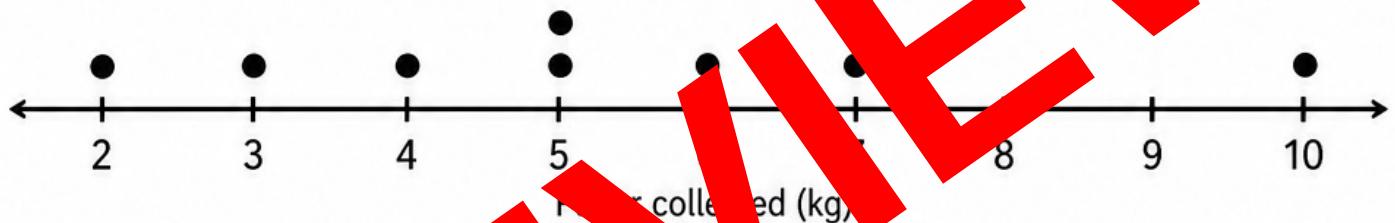
Date: _____

The dot plots show the mass of paper collected by eight groups in two weeks.
Compare the distributions using mode, range and shape.

WEEK A



WEEK B



Feature	Week A	Week B
Mode		
Range calculation		
Most common		
Outlier		

1. Which week was more consistent? Use the ranges as evidence.

2. How does the value at 10 kg affect the shape of Week B?

3. Write a two-sentence comparison using mode, range and shape.

COMPARING DATA SETS

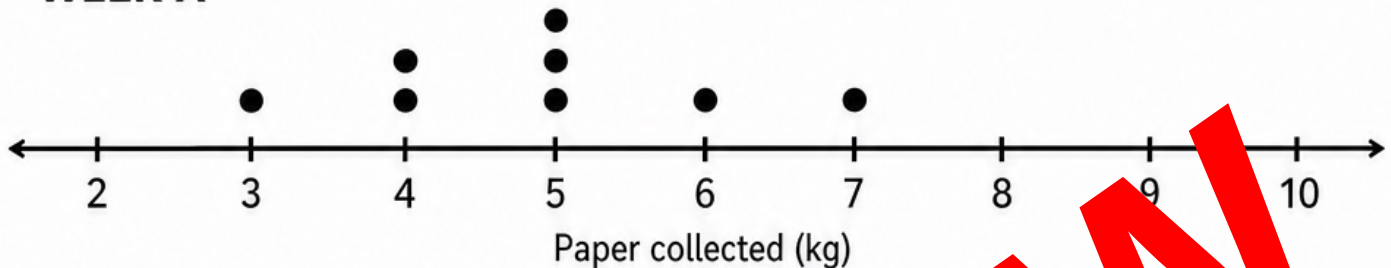
Page 1 — Recycling Weights

Name: ANSWERS

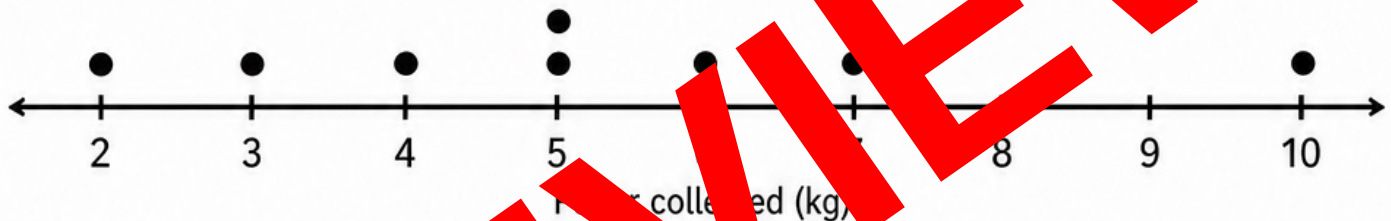
Date: _____

The dot plots show the mass of paper collected by eight groups in two weeks.
Compare the distributions using mode, range and shape.

WEEK A



WEEK B



Feature	Week A	Week B
Mode	5	5
Range calculation	$7 - 3 = 4$	$10 - 2 = 8$
Modal interval	4 to 6 kg	2 to 7 kg, centred at 5
Gap or outlier	None	Gap at 8–9; possible outlier at 10

1. Which week was more consistent? Use the ranges as evidence.

Week A is more consistent because its range is 4, compared with 8 for Week B.

2. How does the value at 10 kg affect the shape of Week B?

The 10 kg value creates a right-hand tail, increases the range and may be an outlier.

3. Write a two-sentence comparison using mode, range and shape.

Both weeks have a mode of 5 kg. Week A is tightly clustered with range 4, while Week B has range 8 and a gap before 10 kg.

COMPARING DATA SETS

Page 2 — Test the Claims

Name: _____

Date: _____

Use the two data sets to decide whether each claim is supported. Circle YES or NO and record evidence.

EAST SITE
6, 7, 7, 8, 8, 8, 9, 10

WEST SITE
5, 6, 7, 8, 8, 9, 10, 12

Feature	East	West
Mode		
Range		

1. Both sites have the same mode.	YES / NO	Evidence: _____ _____
2. West Site is more consistent.	YES / NO	Evidence: _____ _____
3. East Site is mainly clustered from 7 to 9.	YES / NO	Evidence: _____ _____
4. Both sites have the same range.	YES / NO	Evidence: _____ _____
5. West Site has a number that is an outlier at _____.	YES / NO	Evidence: _____ _____

REPAIR THE EVIDENCE

Choose one unsupported claim and rewrite it so it is accurate.

COMPARE

Write a short comparison using mode, range and shape.

COMPARING DATA SETS

Page 2 — Test the Claims

Name: ANSWERS

Date: _____

Use the two data sets to decide whether each claim is supported. Circle YES or NO and record evidence.

EAST SITE
6, 7, 7, 8, 8, 8, 9, 10

WEST SITE
5, 6, 7, 8, 8, 9, 10, 12

Feature	East	West
Mode	8	8
Range	$10 - 6 = 4$	$12 - 5 = 7$

1. Both sites have the same mode.	☒ YES / ☐ NO	Evidence: <u>Both modes are 8.</u>
2. West Site is more consistent.	☐ YES / ☒ NO	Evidence: <u>East has the smaller range of 4 compared with 7.</u>
3. East Site is mainly clustered from 7 to 9.	☒ YES / ☐ NO	Evidence: <u>5 of the eight East values are from 7 to 9.</u>
4. Both sites have the same range.	☐ YES / ☒ NO	Evidence: <u>East range = 4; West range = 7.</u>
5. West Site has a possible high outlier at 12.	☐ YES / ☒ NO	Evidence: <u>There is a gap at 11 before the single value at 12.</u>

REPAIR THE EVIDENCE

Choose one unsupported claim and rewrite it so it is accurate.

West Site is more spread out, not more consistent, because its range is 7.

COMPARE

Write a short comparison using mode, range and shape.

Both sites have a mode of 8. East is clustered from 7 to 9 with range 4. West has range 7 and a possible high outlier at 12, so East is more consistent.

CHOOSING DISPLAYS AND CHECKING CLAIMS

Page 1 — Match the Display

Name: _____

Date: _____

For each investigation, name the variable subtype and choose the display that makes the evidence easiest to compare.

A GROUPED BAR CHART — compare categories across groups	B ORDERED BAR CHART — show ranked categories	C ALIGNED DOT PLOTS — compare numerical distributions	D LINE GRAPH — show change over time
---	---	--	---

Investigation	Variable subtype	Best display	Why?
1. Compare favourite lunch choices in 6A and 6B.		A / B / C / D	
2. Compare running times for two training groups.		A / B / C / D	
3. Track noon temperature across seven days.		A / B / C / D	
4. Show student confidence levels: low, medium, high.		A / B / C / D	
5. Compare the number of pets owned by two classes.		A / B / C / D	
6. Compare preferred lunch choices in two years.		A / B / C / D	

7. Explain why aligned scales matter when two displays are compared.

8. Choose one investigation. Explain why another display would be less useful.

CHOOSING DISPLAYS AND CHECKING CLAIMS

Page 1 — Match the Display

Name: **ANSWERS**

Date: _____

For each investigation, name the variable subtype and choose the display that makes the evidence easiest to compare.

A GROUPED BAR CHART — compare categories across groups	B ORDERED BAR CHART — show ranked categories	C ALIGNED DOT PLOTS — compare numerical distributions	D LINE GRAPH — show change over time
---	---	--	---

Investigation	Variable subtype	Best display	Why?
1. Compare favourite lunch choices in 6A and 6B.	Nominal	A	Compare category counts across two classes.
2. Compare running times for two training groups.	Continuous	C	Show two measured-time distributions.
3. Track noon temperature across seven days.	Continuous	D	Show change in a measure over time.
4. Show student confidence levels: low, medium, high.	Ordinal	B	Keep the response levels in order.
5. Compare the number of pets owned by two classes.	Discrete	C	Compare two counted-number distributions.
6. Compare preferred lunch choices in two year levels.	Nominal	A	Compare category counts across year levels.

7. Explain why aligned scales matter when two displays are compared.

— **Aligned scales give equal visual intervals, so differences can be compared fairly and are not exaggerated.**

8. Choose one investigation. Explain why another display would be less useful.

— **Example, investigation 2: a bar chart would hide clusters, gaps and unusual running times that aligned dot plots reveal.**

CHOOSING DISPLAYS AND CHECKING CLAIMS

Page 2 – Detect Misleading Displays

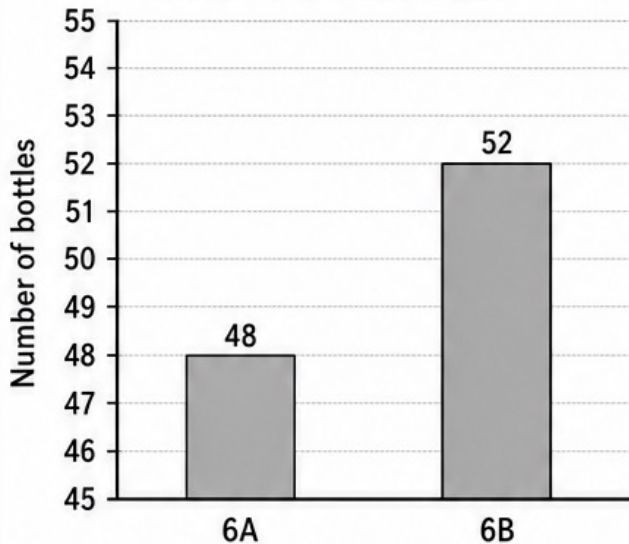
Name: _____

Date: _____

Inspect each display carefully. Identify what could mislead a reader, then rewrite the message accurately.

A. TRUNCATED SCALE

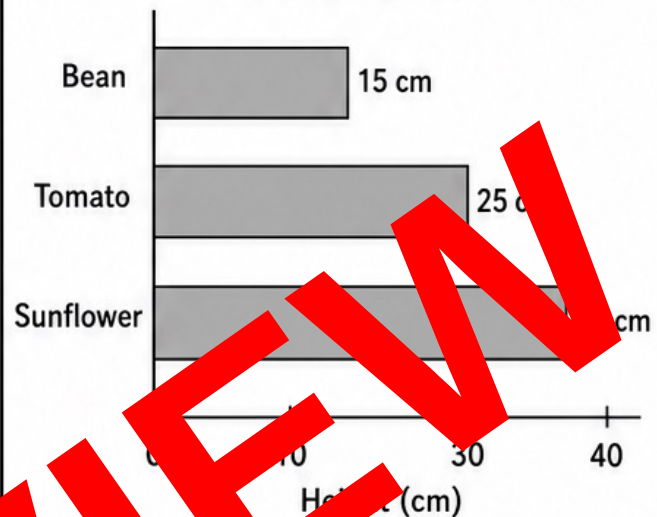
WATER BOTTLES USED



Claim: 6B used more than twice as many bottles as 6A.

B. UNEQUAL INTERVALS

PLANT HEIGHTS



The tick marks are equally spaced, but the numbers are not.

1. What feature makes Panel A look more dramatic than the data?

2. Is the Panel A claim supported by the values as evidence.

3. Rewrite the Panel A claim accurately.

4. What is wrong with the intervals in Panel B?

5. Why could unequal intervals distort a comparison?

6. List three checks to make before trusting a data display.

CHECK: title • labels • scale • equal intervals • source • claim

CHOOSING DISPLAYS AND CHECKING CLAIMS

Page 2 – Detect Misleading Displays

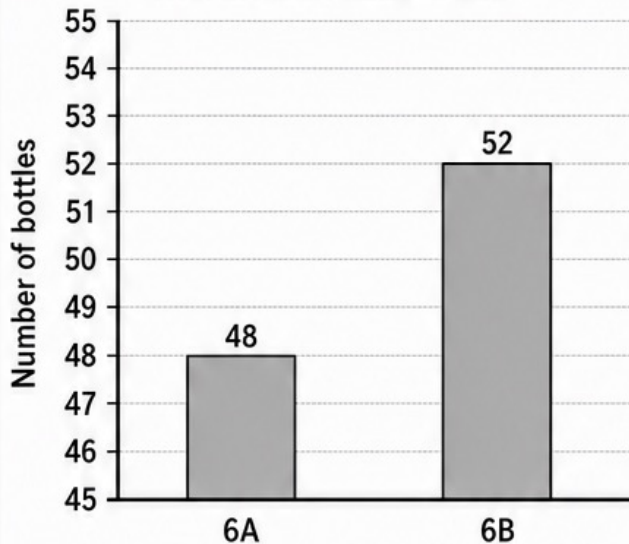
Name: **ANSWERS**

Date: _____

Inspect each display carefully. Identify what could mislead a reader, then rewrite the message accurately.

A. TRUNCATED SCALE

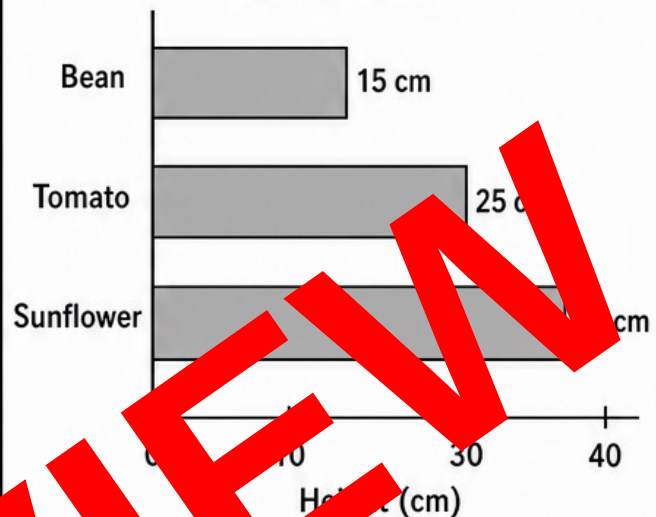
WATER BOTTLES USED



Claim: 6B used more than twice as many bottles as 6A.

B. UNEQUAL INTERVALS

PLANT HEIGHTS



The tick marks are equally spaced, but the numbers are not.

1. What feature makes Panel A look more dramatic than the data?

The vertical axis starts at 45 instead of 0, so a 4-bottle difference looks very large.

2. Is the Panel A claim supported? Give the values as evidence.

No. 6B used 4 more bottles than 6A used 48; 52 is only 4 more, not more than twice 48.

3. Rewrite the Panel A claim accurately.

6B used 4 more bottles than 6A.

4. What's wrong with the intervals in Panel B?

Equal spaces represent changes of 10, then 20, then 10.

5. Why could unequal intervals distort a comparison?

Equal visual distances do not represent equal numerical changes, so bar lengths can mislead.

6. List three checks to make before trusting a data display.

Example: check the title and labels; check the scale and equal intervals; check the source and claim.

CHECK: title • labels • scale • equal intervals • source • claim

DATA INVESTIGATION PLANNER

Page 1 — Question and Method

Name: _____

Date: _____

Plan a fair investigation that produces data you can display, interpret and compare.

1. INVESTIGATION QUESTION

What do you want to find out?

2. VARIABLE

Variable: _____

Subtype: nominal / ordinal / discrete / continuous

How do you know?

3. POPULATION AND SAMPLE

Population: _____

Sample size: _____

How do you know your sample is fair?

4. COLLECTION METHOD

Describe exactly how you will collect the data.

☐ survey

☐ observation

☐ counting

☐ measuring

5. SCALE, VALUE OR UNIT

Give response options, counting rule or measurement unit.

6. PREDICTION

What pattern, mode or range do you expect? Why?

7. FAIR AND RESPONSIBLE

☐ same question or method

☐ same unit and precision

☐ no names recorded

☐ data checked for errors

Ready to collect data: YES / NOT YET

DATA INVESTIGATION PLANNER

Page 2 — Display, Compare and Conclude

Name: _____

Date: _____

Investigation question: _____

1. RECORD THE DATA

Enter one value or category per cell.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

2. CHOOSE AND CHECK THE DISPLAY

- ☐ grouped bar chart
☐ ordered bar chart
☐ aligned dot plots
☐ line graph
☐ other: _____

Why is this display suitable?

3. DRAW YOUR DISPLAY

title

labels

axis scale

key if needed

Grid area for drawing the display.

4. INTERPRET THE DISTRIBUTION

Mode: _____

Range calculation: _____

Main cluster or peak: _____

Gap, outlier or other shape feature:

5. COMPARE AND CONCLUDE

How does your data compare with another group or sample?

What evidence supports your conclusion?

What limitation or next step should be reported?

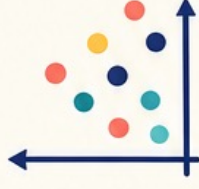
☐ data checked

☐ display checked

☐ claim supported by evidence



RANGE ROUND-UP



Calculate the range. Explain your evidence. Race to 20!

HOW TO PLAY

1. Each player places a token on START.
2. Shuffle the Range Cards and place them face down.
3. Draw a card. Calculate: maximum - minimum.
4. A partner checks the answer key.
5. Correct answer: move 2 spaces. Name the maximum and minimum: move 1 bonus space.
6. Incorrect answer: stay where you are and discuss the calculation.
7. The first player to reach or pass FINISH wins.



PLAYERS: 2-4



YOU NEED: tokens, Range Cards, answer key



RANGE = maximum - minimum



RANGE ROUND-UP – CARDS 1-12



Calculate the range: maximum – minimum.

1 Find the range

3, 8, 5, 6

min → max

2

12, 15, 4, 17

min → max

3

4, 4, 9, 6, 7

min → max

4

21, 19, 25, 23

min → max

5

Find the range

8, 11, 8, 10

min → max

6

Find the range

30, 24, 27, 29

min → max

7

Find the range

5, 12, 9, 7

min → max

8

Find the range

14, 18, 16, 20

min → max

9

Find the range

2, 10, 6, 4

min → max

10

Find the range

33, 39, 36, 35

min → max

11

Find the range

17, 15, 22, 18

min → max

12

Find the range

40, 44, 41, 46

min → max

RANGE ROUND-UP — CARDS 13-24

Calculate the range: maximum – minimum.

13

Find the range

6, 6, 6, 9, 8



14

Find the range

11, 20, 5, 13



15

Find the range

25, 18, 22, 20



16

Find the range

7, 14, 14, 10



17

Find the range

31, 31, 38, 35



18

Find the range

4, 16, 9, 12



19

Find the range

50, 43, 47, 45



20

Find the range

9, 19, 11, 15



21

Find the range

28, 21, 23, 26



22

Find the range

13, 27, 19, 22



23

Find the range

42, 38, 44, 40



24

Find the range

16, 29, 20, 25





RANGE ROUND-UP — ANSWER KEY



Check the maximum, minimum and range.

Card number	maximum – minimum = range
1	$8 - 3 = 5$
2	$17 - 12 = 5$
3	$9 - 4 = 5$
4	$25 - 19 = 6$
5	$11 - 8 = 3$
6	$30 - 24 = 6$
7	$12 - 5 = 7$
8	$20 - 14 = 6$

Card number	maximum – minimum = range
9	$10 - 2 = 8$
10	$33 - 33 = 0$
11	$22 - 15 = 7$
12	$18 - 12 = 6$
13	$9 - 6 = 3$
14	$20 - 11 = 9$
15	$25 - 18 = 7$
16	$14 - 7 = 7$

Card number	maximum – minimum = range
17	$38 - 31 = 7$
18	$16 - 4 = 12$
19	$50 - 43 = 7$
20	$19 - 9 = 10$
21	$28 - 21 = 7$
22	$27 - 13 = 14$
23	$44 - 38 = 6$
24	$29 - 16 = 13$



RANGE = maximum – minimum



COMMUNITY GARDEN DATA CHALLENGE

Assessment Page 1 — Classify and Read

Name: _____

Date: _____

A community garden team collected categorical and numerical data to evaluate its growing season. Show clear evidence for every conclusion.

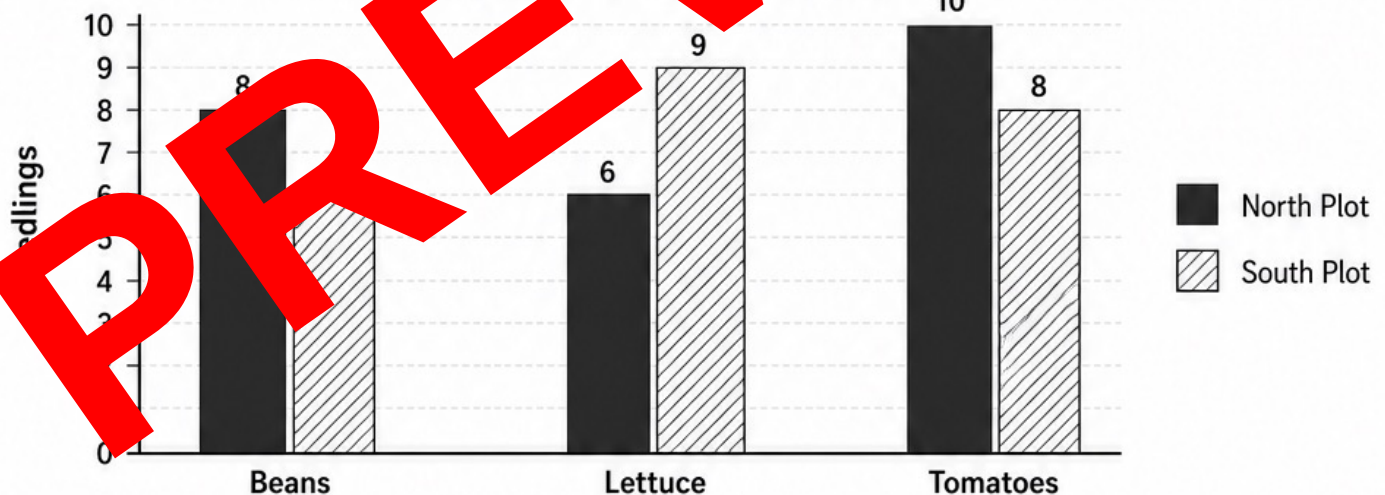
A. CLASSIFY THE VARIABLES

Variable	Broad type	Subtype
1. Vegetable variety		
2. Harvest quality: low, medium or high		
3. Number of tomatoes harvested		
4. Pumpkin mass in kilograms		

Choose one variable and justify its subtype.

B. READ THE COMPARATIVE DISPLAY

SEEDLINGS THAT SURVIVED



5. Which plot had more surviving bean seedlings? By how many?

6. Which vegetable had the greatest combined survival? Show the total.

7. For which vegetable was the difference between plots greatest?

8. Write one other true comparison supported by the display.

Continue to Assessment Page 2.

COMMUNITY GARDEN DATA CHALLENGE

Assessment Page 1 — Classify and Read

Name: ANSWERS

Date: _____

A community garden team collected categorical and numerical data to evaluate its growing season. Show clear evidence for every conclusion.

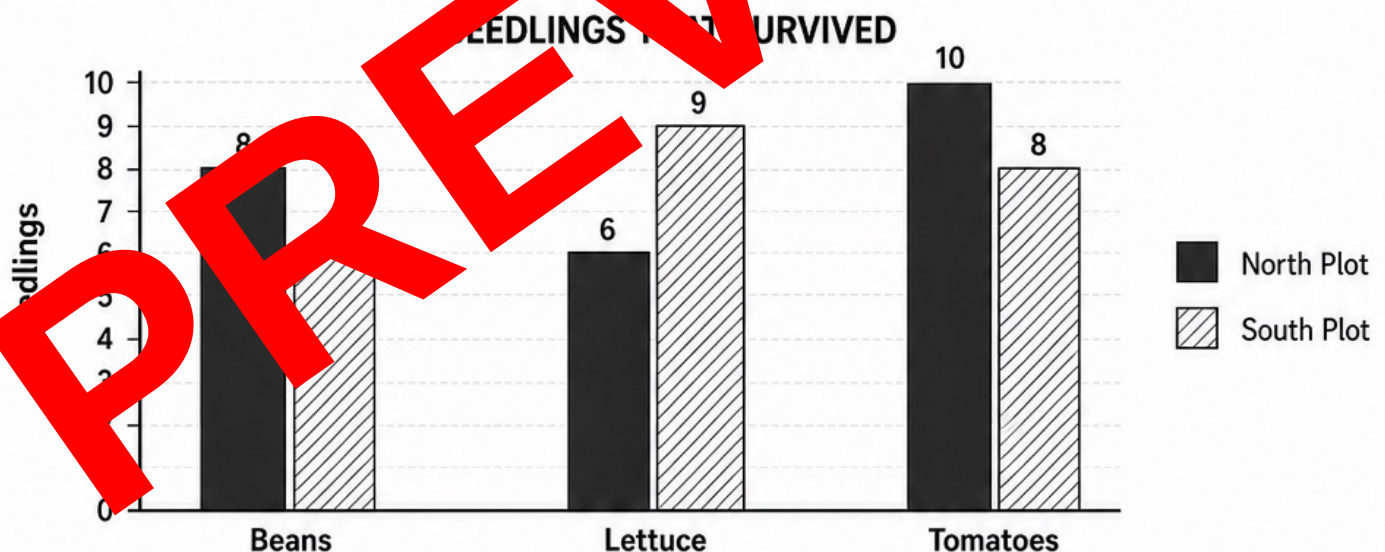
A. CLASSIFY THE VARIABLES

Variable	Broad type	Subtype
1. Vegetable variety	Categorical	Nominal
2. Harvest quality: low, medium or high	Categorical	Ordinal
3. Number of tomatoes harvested	Numerical	Discrete
4. Pumpkin mass in kilograms	Numerical	Continuous

Choose one variable and justify its subtype.

Example, pumpkin mass is measured and can take any value within a range, so it is continuous numerical data.

B. READ THE COMPARATIVE DISPLAY



5. Which plot had more surviving bean seedlings? By how many?

North Plot, by 2 seedlings. $8 - 6 = 2$.

6. Which vegetable had the greatest combined survival? Show the total.

Tomatoes, with 18 seedlings. $10 + 8 = 18$.

7. For which vegetable was the difference between plots greatest?

Lettuce. The difference is $9 - 6 = 3$ seedlings.

8. Write one other true comparison supported by the display.

Example: South Plot had 3 more surviving lettuce seedlings than North Plot.

Continue to Assessment Page 2.

COMMUNITY GARDEN DATA CHALLENGE

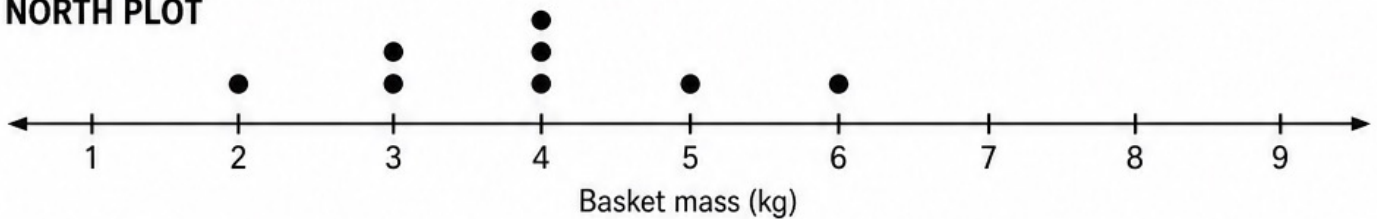
Assessment Page 2 — Compare and Evaluate

Name: _____

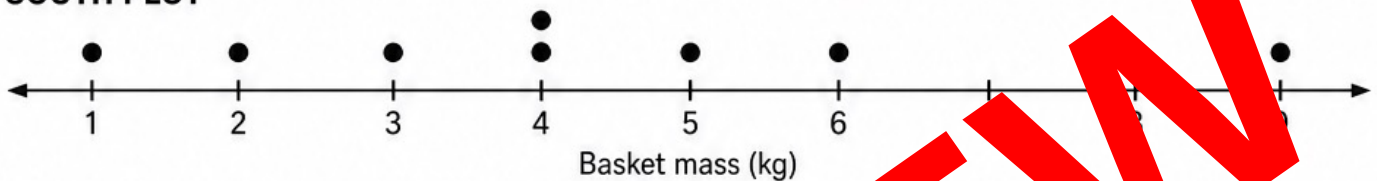
Date: _____

The dot plots show the mass of eight harvest baskets from each plot. Use mode, range and shape to support your conclusions.

NORTH PLOT



SOUTH PLOT



Feature	North Plot	South Plot
Mode		
Range calculation		
Shape evidence		

9. Describe one important feature of each distribution's shape.

10. Which plot is more consistent? Use the ranges as evidence.

11. A gardener claims: 'South Plot usually produced heavier baskets because its maximum is 9 kg.' Is this claim supported? Explain.

12. Write a balanced comparison using mode, range and shape.

13. Which display would you choose to compare these results with a third plot? Explain why aligned scales matter.

14. State one limitation of this evidence and one useful next step.

CHECK: every conclusion names data evidence.

COMMUNITY GARDEN DATA CHALLENGE

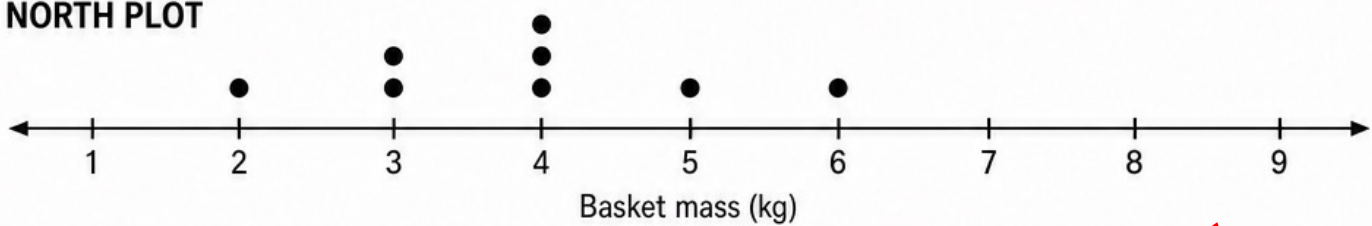
Assessment Page 2 — Compare and Evaluate

Name: _____ **ANSWERS**

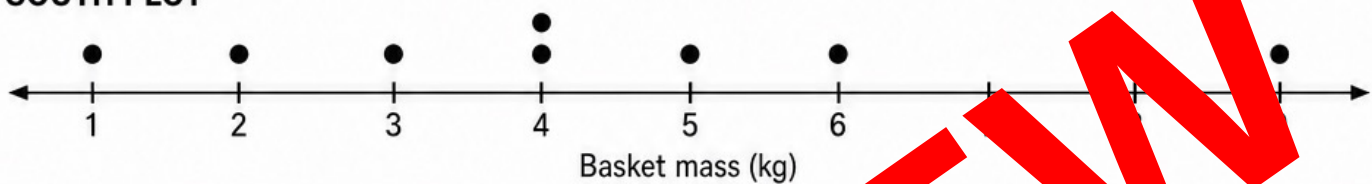
Date: _____

The dot plots show the mass of eight harvest baskets from each plot. Use mode, range and shape to support your conclusions.

NORTH PLOT



SOUTH PLOT



Feature	North Plot	South Plot
Mode	4	4
Range calculation	$6 - 2 = 4$	$9 - 1 = 8$
Shape evidence	Clusters from 3	No values at 7–8; possible outlier at 9

9. Describe one important feature of each distribution's shape.

North is tightly clustered around 4. South is more spread out; values 7 and 8 are missing before 9.

10. Which plot was more consistent? Use the ranges as evidence.

North Plot is more consistent because its range is 4, compared with 8 for South Plot.

11. A farmer claims: "South Plot usually produced heavier baskets because its maximum is 9 kg." Is this claim supported? Explain.

No, both modes are 4 kg, and one maximum of 9 kg does not show what usually happened.

12. Write a balanced comparison using mode, range and shape.

Both plots have mode 4 kg. North has range 4 and a tight cluster; South has range 8 and an isolated value at 9 kg.

13. Which display would you choose to compare these results with a third plot? Explain why aligned scales matter.

Use a third aligned dot plot on the same 1–9 kg scale so equal distances represent equal masses.

14. State one limitation of this evidence and one useful next step.

Limitation: only eight baskets from one season. Next step: collect larger samples over several harvests.

CHECK: every conclusion names data evidence.

YEAR 6 DATA AND STATISTICS RUBRIC

– interpreting and comparing data sets

Student: _____ Date: _____

Criteria	BEGINNING	DEVELOPING	ACHIEVING	CONFIDENT	EXCEEDING
Classifies variables	Needs support to identify broad data types.	Identifies some categorical and numerical variables.	Correctly classifies nominal, ordinal, discrete and continuous variables.	Classifies variables and explains the defining clue.	Handles unfamiliar or ambiguous contexts with precise justification.
Reads comparative displays	Retrieves few values accurately.	Reads simple value with some errors.	Makes aligned comparative displays accurately.	Combines and compares values efficiently.	Interprets complex patterns and checks display fairness.
Uses mode and range	Needs support to calculate.	Calculates one measure correctly.	Calculates mode and range accurately.	Uses calculations as comparison evidence.	Explains what the measures reveal and hide.
Compares distribution shape	Gives a general statement without evidence.	Names one feature such as a cluster or gap.	Compares distributions using mode, range and shape.	Explains clusters, gaps, spread and outliers clearly.	Synthesises several features into a nuanced conclusion.
Evaluates displays and claims	Accepts claims without checking data.	Notices an obvious issue with support.	Checks scales, intervals and claims against evidence.	Explains how design choices may mislead.	Repairs claims and recommends a fairer display.
Communicates evidence	Response is incomplete or unclear.	Uses some data vocabulary.	States a clear conclusion with relevant evidence.	Uses precise vocabulary, calculations and comparisons.	Communicates limitations and next steps insightfully.
Overall judgement:					
Teacher feedback:					

Year 6 Data and Statistics



Learning Goals

By the end of this unit, you can:

- identify nominal, ordinal, discrete and continuous variables
- compare displays using mode, range and shape
- choose digital tools and justify a statistical claim



What Is Data?

Data are collected values that answer a question.

A data set needs a clear variable, a population and a method.

Example question: How many minutes do Year 6 students read each day?

Good statistics begins with a question worth investigating.



Variables and Values

A variable is the feature that can change.

A value is one record or result for that variable.

Variable: travel method to school. Value: bicycle.

Variable: journey time. Value: 18 minutes.



Four Variable Types

CATEGORICAL → nominal or ordinal

NUMERICAL → discrete or continuous

The variable type indicates how data are recorded and displayed.

Always classify the variable before choosing a graph.



Nominal Data

Nominal categories have names but no natural order.

Examples: eye colour, lunch choice, suburb, transport type.

Reordering the categories does not change their meaning.

Useful displays include bar graphs and dot plots of frequencies.



Ordinal Data

Ordinal categories have a meaningful order.

Examples: never / sometimes / often / always; low / medium / high.

The gaps between categories are not measured amounts.

Keep the order visible when you build or compare displays.



Discrete Data

Discrete numerical data are counted in separate values.

Examples: goals scored, pets owned, books borrowed.

A value such as 2.5 pets does not make sense.

Dot plots, frequency tables and column graphs can show the distribution.



Continuous Data

Continuous numerical data are measured on a scale.

Examples: height, time, temperature and mass.

Values can lie between recorded measurements.

Intervals, histograms or scaled dot plots can help show the distribution.



Classify

Decide the variable type before you display the data.

Favourite playground → nominal categorical

Agreement rating from 1 to 5 → ordinal categorical

Number of seedlings → discrete numerical

Plant height in centimetres → continuous numerical



Compare Displays

Use the same scale, intervals and category order when comparing.

Look for what is typical, how spread out values are and the overall shape.

Check sample size before making a strong claim.

A display supports reasoning; it does not replace it.



Categorical Example

Class A transport: walk 8, car 6, bus 4, bicycle 6.

Class B transport: walk 5, car 9, bus 4, bicycle 6.

Both classes have 24 students.

The modal category is walk for A and car for B.



Numerical Example

Daily reading minutes

Group A: 10, 15, 20, 20, 20, 25

Group B: 10, 10, 15, 20, 25, 30, 30

Compare the entire spread and shape—not just one number.



Find the Mode

The mode is the value or category occurring most often.

For 3, 4, 4, 5, the mode is 4.

A data set may have one mode, several modes or no mode.

For categorical data, report the modal category.



Find the Range

Range = maximum – minimum.

For 3, 4, 4, 5, 6, range = $6 - 3 = 3$.

A larger range usually means greater overall spread.

Range uses only the two endpoints, so also inspect the full display.



Read the Shape

Ask where values cluster and where gaps or extremes appear.

SYMMETRIC values balance around the centre.

SKEWED a longer tail stretches to one side.

CLUSTER, GAPS and OUTLIERS can change the story.



Compare Distributions

Group A mode 20, range 1, values cluster near 20.

Group B has no single mode, range 40; values are more spread out.

A strong comparison needs evidence and explains what it means.

Don't say only that one graph is "bigger".



Spot a Misleading Graph

Check that both axes begin and progress fairly.

Unequal intervals or a truncated scale can exaggerate differences.

Pictures that change in height and width distort area.

Read labels, units, source and sample size before accepting a claim.



Choose the Display

Nominal or ordinal categories → bar/column graph.

Discrete numeric values → dot plot or frequency graph.

Continuous measurements → grouped intervals or histogram.

Choose the display that makes the comparison easiest to see.



Use Digital Tools

Enter one observation per row and label every column.

Sort or filter only after keeping the original data safely.

Create comparable graphs with matching scales and labels.

Recheck calculated means, range and totals against the raw data.



Investigation Cycle

1. Ask a focused statistical question.
2. Plan a fair way to collect or source data.
3. Record, organize and classify the values.
4. Display, compare, interpret and communicate with evidence.



Worked Comparison

Plant heights (cm)

Bed A: 12, 14, 15, 15, 17, 18 → mode 15, range 6

Bed B: 10, 12, 14, 16, 18, 20, 22 → no mode, range 12

Bed A is more tightly clustered; Bed B is more variable.



Check Your Thinking

Can you name the variables and classifying its type?

Are the scores and sample sizes comparable?

Have you used words, range and shape where appropriate?

Does your conclusion state evidence and acknowledge a limitation?



Key Ideas

Classify first: nominal, ordinal, discrete or continuous.

Compare fairly: same scale, clear labels and suitable displays.

Describe distributions using mode, range, shape, gaps and outliers.

Make cautious claims that are supported by the data.



Year 6
Data and Statistics
Quiz



Q1: Which Type?

A survey records each student's main way of travelling to school.

What type of variable is this?

- A ordinal categorical B nominal categorical
C discrete numerical D continuous numerical



Answer

B – nominal categorical.

The values are categorical names such as walk, bicycle, bus or car.

There is no natural ranked order.



Q2: Nominal or Ordinal?

Students choose never, sometimes, often or always.

Why is the variable ordinal rather than nominal?

The categories are numbers.

But the categories have a meaningful order.



Answer 2

B – the categories have a meaningful order.

Never comes before sometimes, often and always.

The gaps are not measured equal amounts.



Q3: Discrete or Continuous?

Which variable is continuous numerical?

A number of siblings B goals scored

C time to run 50 metres D books borrowed



Answers

C – time to run 100 metres.

Time is measured and can take values between recorded points.

The other variables are counts.



Q4: Find the Mode

Find the mode of this data set.

7, 14, 14, 17, 17, 20

Explain what the mode tells you.



Answer

Mode 17.

The value 17 occurs three times more often than any other value.

It is the most frequent result in this data set.



Q5: Find the Range

Find the range of this data set.

8, 9, 12, 13, 13, 16

Show the subtraction you use.



Answers

$$\text{Range} = 10 - 8 =$$

The range describes the distance from the minimum to the maximum.

It does not show how values are arranged in between.



Q6: Compare the Sets

Set A: 4, 5, 5, 5, 6 Set B: 4, 5, 6, 8

Both are centred near 5. Which set is more spread out?

Use the ranges as evidence.



Answer

Set B is more spread out.

Set A range = $6 - 4 = 2$ Set B range = $8 - 2 = 6$.

Set A also has values farther from 5.



Q7: Choose a Display

You want to compare the favourite lunch categories of two

classes

Which display is most suitable?

A two comparison bar graphs B a line graph over time

C a scatter plot

D a map



Answer

A – two comparable bar graphs.

The variable is nominal categorical.

Matching scales and category order make the class comparison fair.



Q8: True or False?

A graph that starts its vertical axis at 95 always gives a fair visual comparison of values from 98 to 100.

True or False? Explain what should be checked.



Answers

False. Check the axis start, interval size and full scale.

The truncated axis exaggerates a small difference.

Read the actual value and redraw with a fair scale if needed.



Q9: Describe the shape

Most values cluster between 10 and 20 but one value is 30.

Which feature does this distribution have?

A an outlier and right-hand tail B perfect symmetry

C normal distribution D nominal order



Answer 1

A – an outlier and tail to the right.

The value 30 is separated from the main cluster.

It increases the range and affects the distribution's shape.



Q10: Evaluate the Claim

Class A has a higher moral score than Class B.

Is that alone enough to say Class A performed better overall?

Name two other pieces of evidence you would inspect.



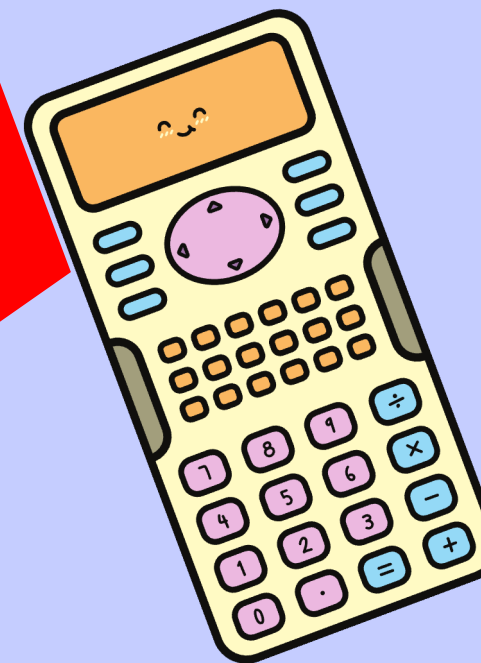
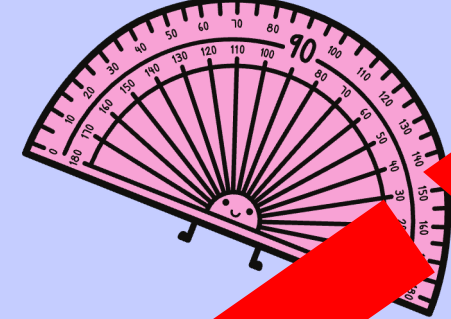
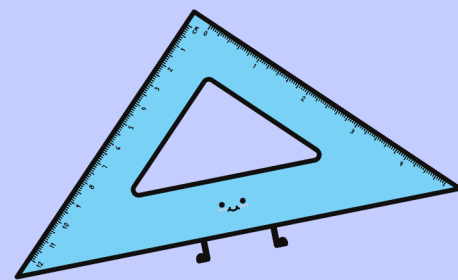
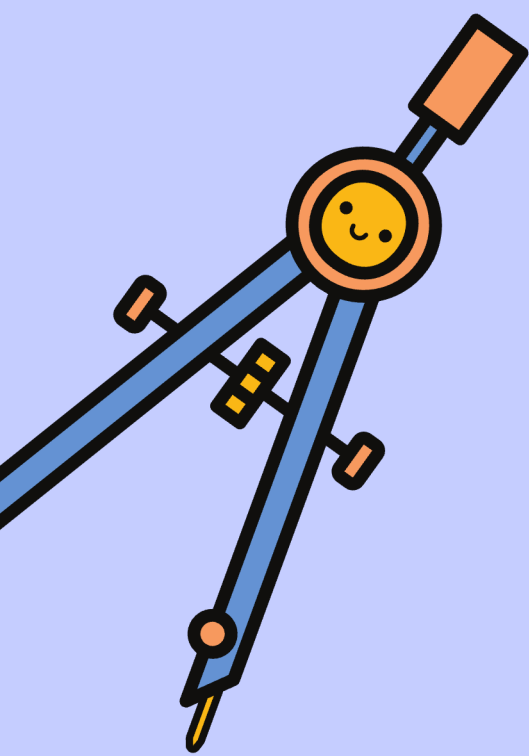
Answer to

No. One mode is not enough for an overall claim.

Also compare range and distribution shape, plus sample size and scale.

can't conclude if acknowledges these limits.





Quiz Complete!

