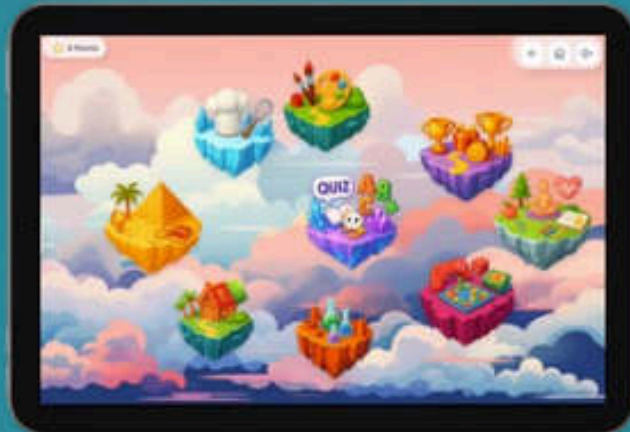




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Data and Interpretation - Year 5

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DATA DETECTIVE QUICK GUIDE



Collect, display, compare and interpret data

1 Ask a good question

- Can everyone answer it?
- Is it clear and fair?
- Will the data help you decide something?



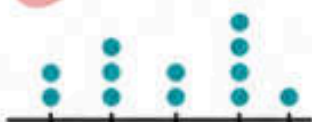
2 Choose the data type

- Categorical data sorts responses into groups.
- Numerical data uses numbers that can be counted or measured.



3 Pick a display

- Column graphs compare categories.
- Dot plots show frequencies.
- Line graphs show change over time.



4 Interpret carefully

- Read the title and scale.
- Compare values.
- Use evidence from the display in your answer.





Data Type Sort Cards



Sort each card into categorical data, numerical data, discrete data or continuous data.

Favourite lunch



Number of siblings



Height in centimetres



Pet type



Daily reading minutes



Transport to school



Temperature at 9 am



Eye colour



Goals scored



Birth month



Water used in litres



Number of pages read



Cut out, sort, justify.





Survey Design Studio



Plan a fair survey before you collect data.

1 Choose a purpose

What decision could your class make using data?



2 Write a survey question

Make it clear, fair and easy to answer.



3 Choose response options

Include choices that match your question.

☐ _____

☐ _____

☐ _____

4 Predict your display

Will a column graph, dot plot or line graph suit your data? Explain why.



Purpose	Survey question	Response options	Best display	Why this display?



How will you make sure everyone is asked in the same way?

Graph Match Cards

Match each data situation to the most suitable display.

1. Favourite canteen lunch

Column graph



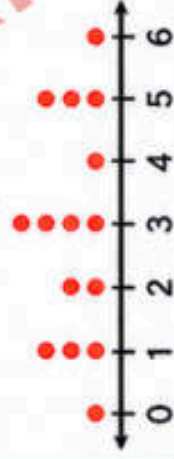
3. Daily temperature this week

Line graph



5. Number of goals scored

Dot plot



2. Books read by students

Dot plot



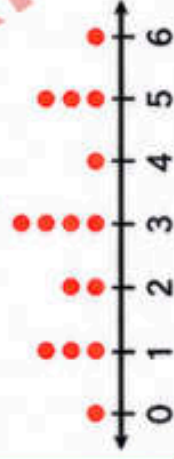
4. Transport to school

Line graph



6. Plant height over six weeks

Dot plot



Column graph



Line graph



Match, explain, then swap with a partner.



Data Decision Trail

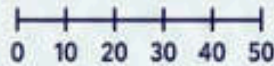
Read, compare and justify using data.



Start



1 Read the scale



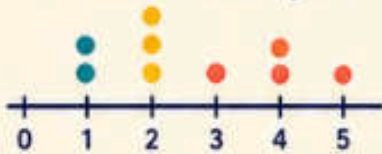
2 Compare two bars



3 Choose a display



6 Interpret a dot plot



5 Collect a survey card



4 Explain a trend



7 Make a claim



8 Check the title



9 Find the difference



10 Question the data



11 Use evidence



12 Partner challenge



Finish



Evidence sentence starters

- The data shows...
- I know this because...
- A better display would be...
- The difference is...





Data Types Detective



Name: _____

Instructions: Decide whether each example is categorical data or numerical data. If it is numerical, decide whether it is discrete or continuous.

Example	Categorical	Numerical discrete	Numerical continuous
Favourite fruit	☐	☐	☐
Number of books read	☐	☐	☐
Height in centimetres	☐	☐	☐
Birth month	☐	☐	☐
Temperature at 9 am	☐	☐	☐
Goals scored in a game	☐	☐	☐
Eye colour	☐	☐	☐
Minutes spent reading	☐	☐	☐
Number of pets	☐	☐	☐
Transport to school	☐	☐	☐

B. Explain your thinking



1. Choose one categorical example. How do you know it is categorical?



2. Choose one continuous numerical example. How do you know it is continuous?



Data Types Detective



ANSWERS

Instructions: Decide whether each example is categorical data or numerical data. If it is numerical, decide whether it is discrete or continuous.

Example	Categorical	Numerical discrete	Numerical continuous
Favourite fruit	☒	☐	☐
Number of books read	☐	☒	☐
Height in centimetres	☐	☐	☒
Birth month	☒	☐	☐
Temperature at 9 am	☐	☐	☒
Goals scored in a game	☐	☒	☐
Eye colour	☒	☐	☐
Minutes spent reading	☐	☐	☒
Number of pets	☐	☒	☐
Transport to school	☒	☐	☐

B. Explain your thinking



1. Choose one categorical example. How do you know it is categorical?

Answers will vary. A categorical example sorts responses into groups, not numbers.



2. Choose one continuous numerical example. How do you know it is continuous?

Answers will vary. A continuous example can be measured and can have values between whole numbers.

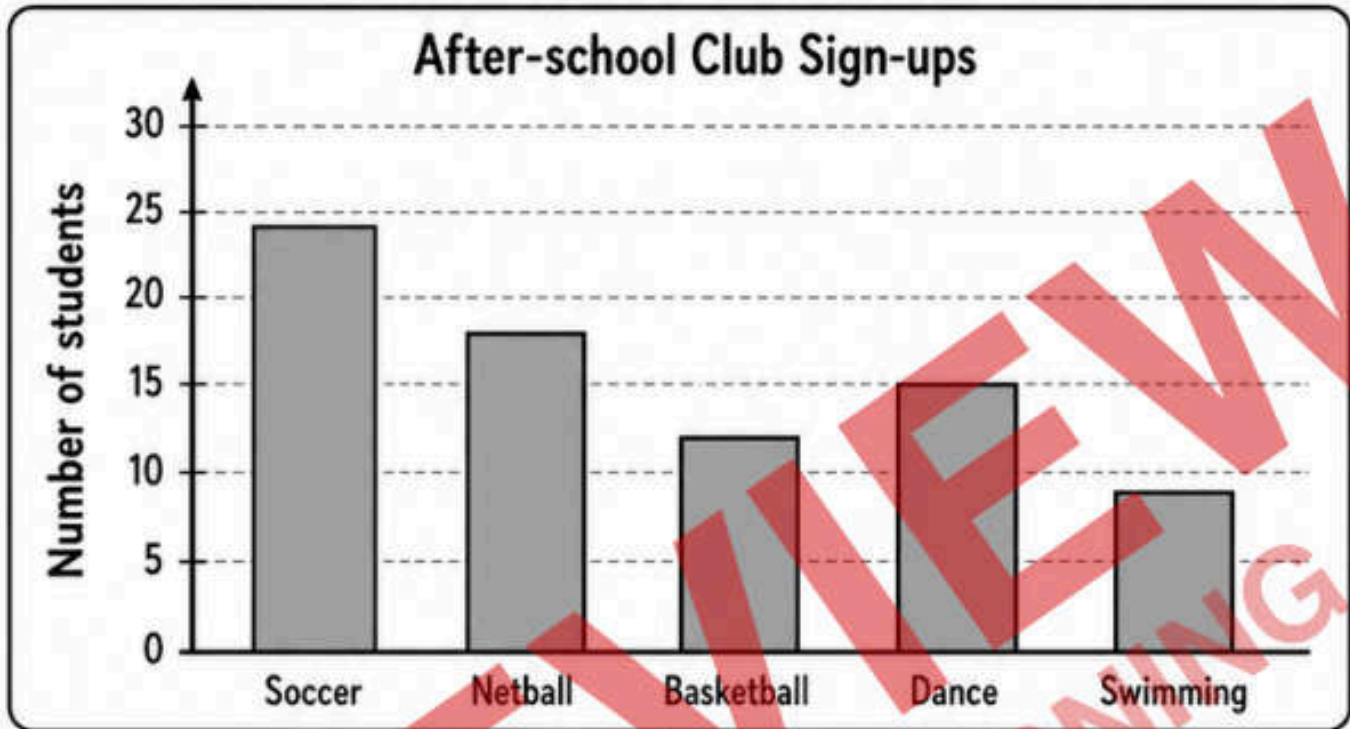


Column Graph Investigator



Name: _____

Instructions: Use the column graph to answer each question. Read the scale carefully.



1. Which club had the most sign-ups?

2. How many students signed up for Dance?

3. How many more students signed up for Netball than Basketball?

4. What is the total number of sign-ups shown?

5. Write one comparison using evidence from the graph.

6. If 6 more students joined Swimming, how many would there be?

Challenge: What question could this graph help the school answer?

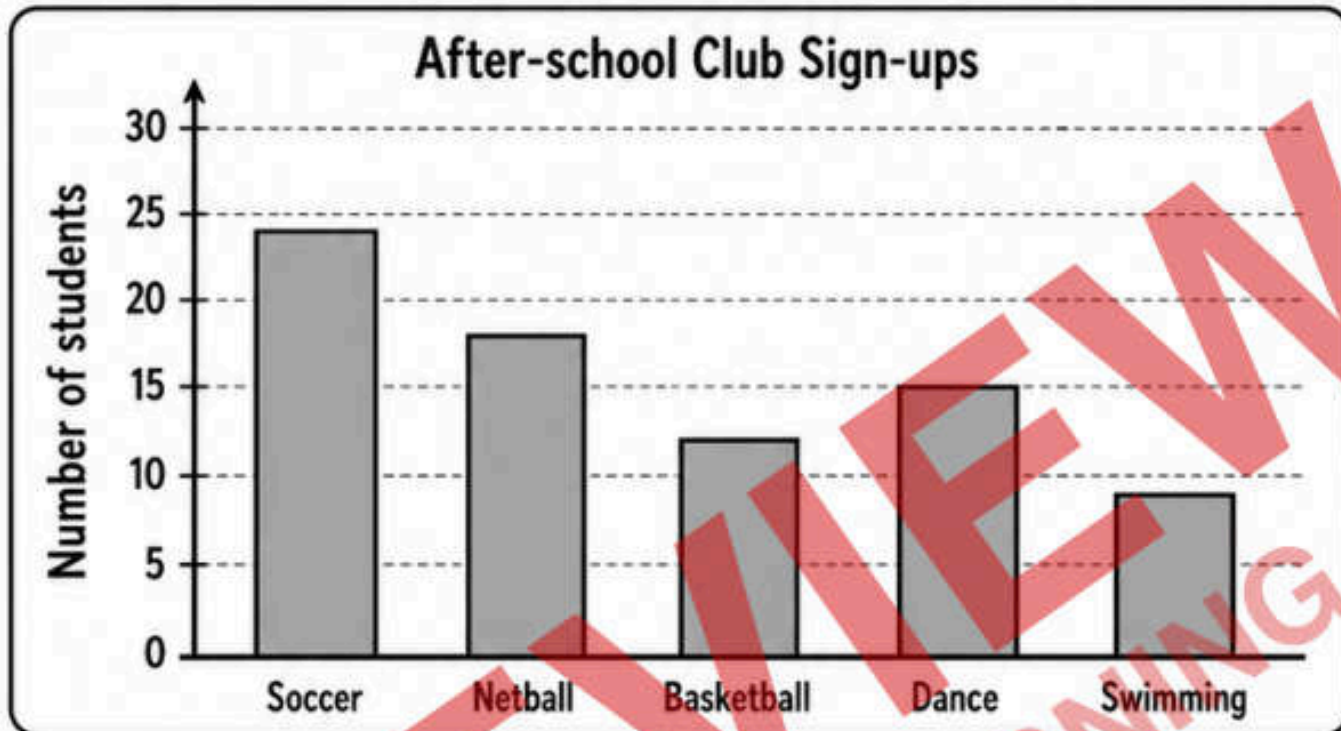


Column Graph Investigator



Name: **ANSWERS**

Instructions: Use the column graph to answer each question. Read the scale carefully.



1. Which club had the most sign-ups?

Soccer

2. How many students signed up for Dance?

15 students

3. How many more students signed up for Netball than Basketball?

6 students

4. What is the total number of sign-ups shown?

78 sign-ups

5. Write one comparison using evidence from the graph.

Sample: Soccer had 15 more sign-ups than Swimming.

6. If 6 more students joined Swimming, how many would there be?

15 students

Challenge: What question could this graph help the school answer?

It could help the school decide which clubs need more coaches or space.



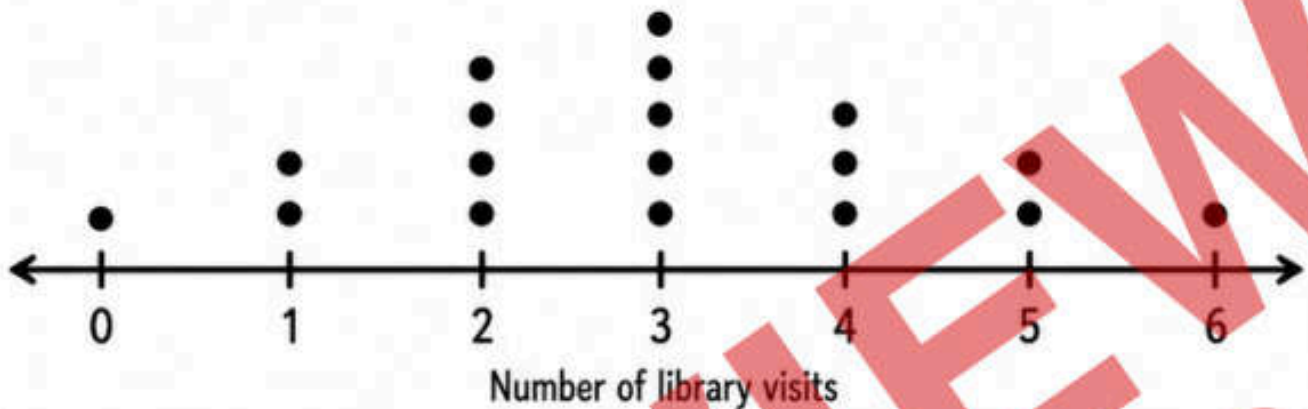
Dot Plot Detective



Name: _____

Instructions: Use the dot plot to answer each question. Each dot represents one student.

Library Visits This Month



1. How many students are represented?

2. What number of visits was most common?

3. How many students visited the library 4 or more times?

4. What is the range of visits?

5. Write one statement that is supported by the data.

6. What extra question could you ask to understand the data better?

Challenge: Explain why a dot plot is a useful display for this data.



Dot Plot Detective



Name: **ANSWERS**

Instructions: Use the dot plot to answer each question. Each dot represents one student.

Library Visits This Month



1. How many students are represented?

18 students

2. What number of visits was most common?

3 visits

3. How many students visited the library 4 or more times?

6 students

4. What is the range of visits?

6 visits

5. Write one statement that is supported by the data.

Sample: More students visited 3 times than any other number of visits.

6. What extra question could you ask to understand the data better?

Sample: Why did students visit the library?

Challenge: Explain why a dot plot is a useful display for this data.

A dot plot is useful because it shows each value and how often it occurs.

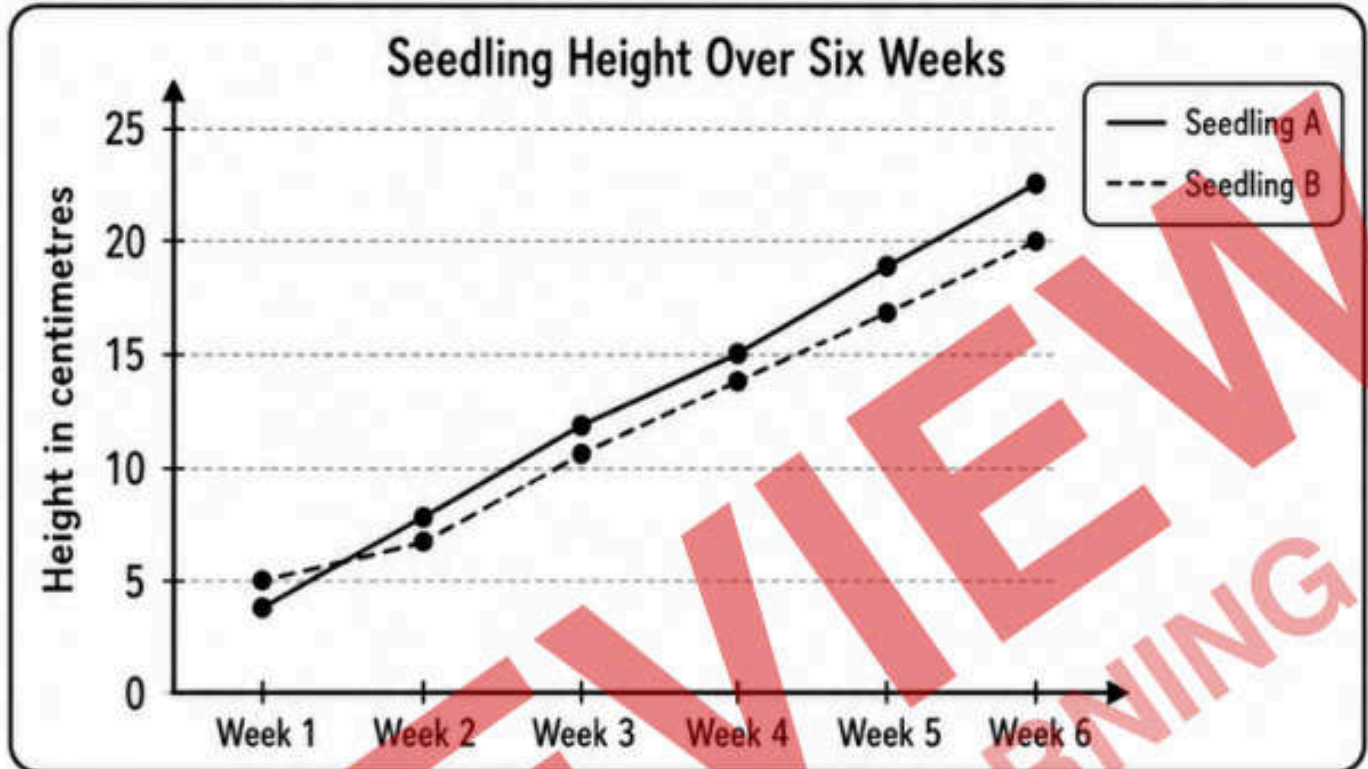


Comparing Line Graphs



Name: _____

Instructions: Use the line graph to compare the growth of two seedlings.



1. Which seedling was taller in Week 1?

2. Which seedling was taller in Week 6?

3. How much did Seedling A grow from Week 1 to Week 6?

4. What was the difference between the seedlings in Week 6?

5. During which week interval did Seedling A grow the most?

6. Write one comparison using evidence from the graph.

Challenge: Why is a line graph suitable for this data?

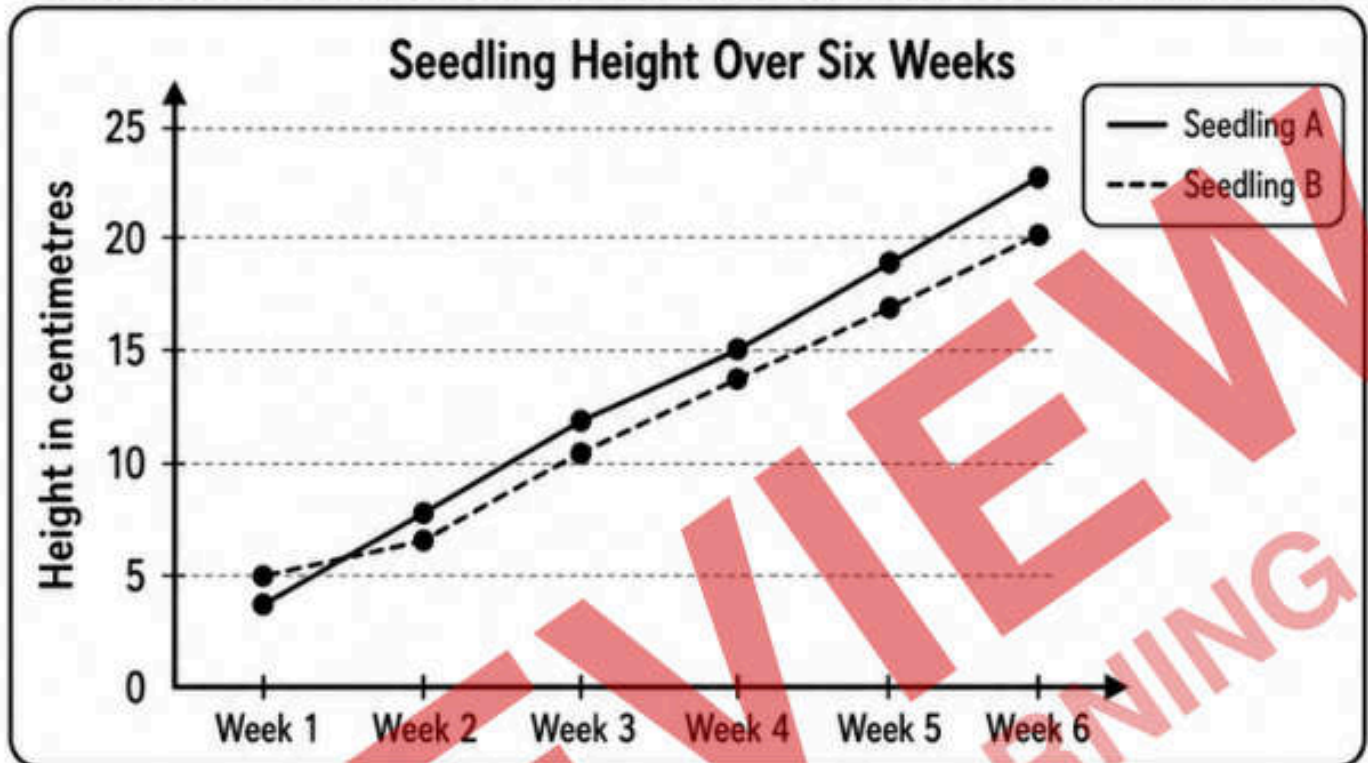


Comparing Line Graphs



Name: ANSWERS

Instructions: Use the line graph to compare the growth of two seedlings.



1. Which seedling was taller in Week 1?
Seedling B
2. Which seedling was taller in Week 6?
Seedling A
3. How much did Seedling A grow from Week 1 to Week 6?
19 cm
4. What was the difference between the seedlings in Week 6?
3 cm
5. During which week interval did Seedling A grow the most?
Week 5 to Week 6
6. Write one comparison using evidence from the graph.
Sample: Seedling A was 3 cm taller than Seedling B in Week 6.

Challenge: Why is a line graph suitable for this data?

A line graph is suitable because it shows change over time.



Survey Results Story



Name: _____

Instructions: Use the survey results to create a column graph, then interpret the data.

Survey question: Which class fundraiser should we choose?

Fundraiser	Votes
Plant sale	8
Art cards	11
Bake stall	14
Walkathon	7
Book swap	5

Graph task: Create a column graph. Choose a clear title, labels and scale.



1. How many students voted altogether? _____
2. Which fundraiser had the most votes? _____
3. Which fundraiser had the fewest votes? _____
4. What is the difference between the most and fewest votes? _____
5. Write a recommendation using evidence from the data.

6. What extra data could the class collect before deciding?



Survey Results Story



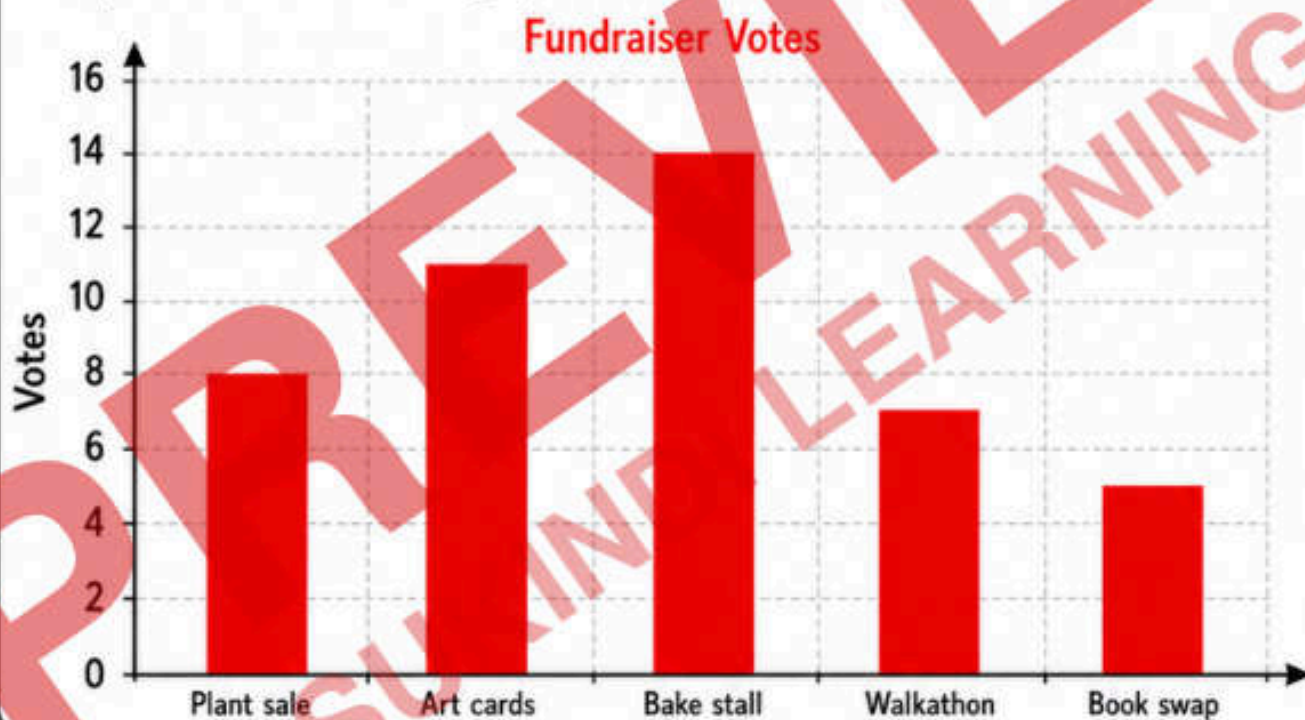
Name: **ANSWERS** _____

Instructions: Use the survey results to create a column graph, then interpret the data.

Survey question: Which class fundraiser should we choose?

Fundraiser	Votes
Plant sale	8
Art cards	11
Bake stall	14
Walkathon	7
Book swap	5

Graph task: Create a column graph. Choose a clear title, labels and scale.



- How many students voted altogether? **45 students**
- Which fundraiser had the most votes? **Bake stall**
- Which fundraiser had the fewest votes? **Book swap**
- What is the difference between the most and fewest votes? **9 votes**
- Write a recommendation using evidence from the data.
Sample: Choose the bake stall because it received the most votes, with 14.
- What extra data could the class collect before deciding?
Sample: Collect data about cost, time, profit or allergies.



Eco Club Data Challenge

Assessment page 1



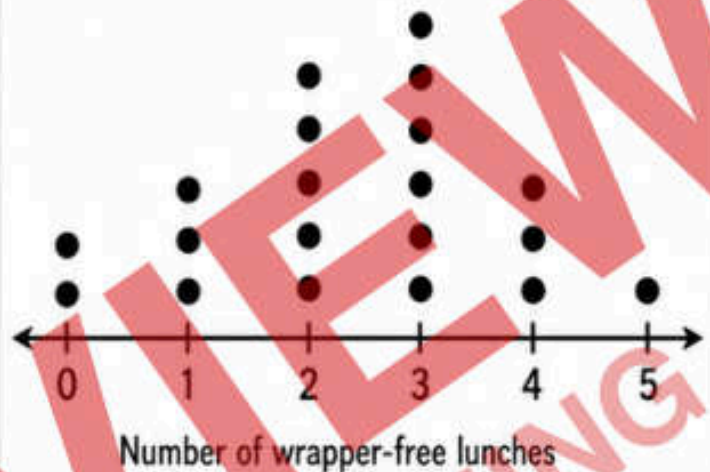
Name: _____

Instructions: Show your thinking and use evidence from the data.

Lunch Waste Survey

Waste type	Number of students
Compost	18
Recycling	11
Landfill	13
Wrapper-free	8

Wrapper-free Lunches Last Week



1. Is the waste type data categorical or numerical? Explain.

2. How many students were surveyed altogether?

3. Which waste type had the greatest number of students?

4. What is the difference between Compost and Wrapper-free?

5. What number of wrapper-free lunches was most common?

6. How many students had 4 or 5 wrapper-free lunches?



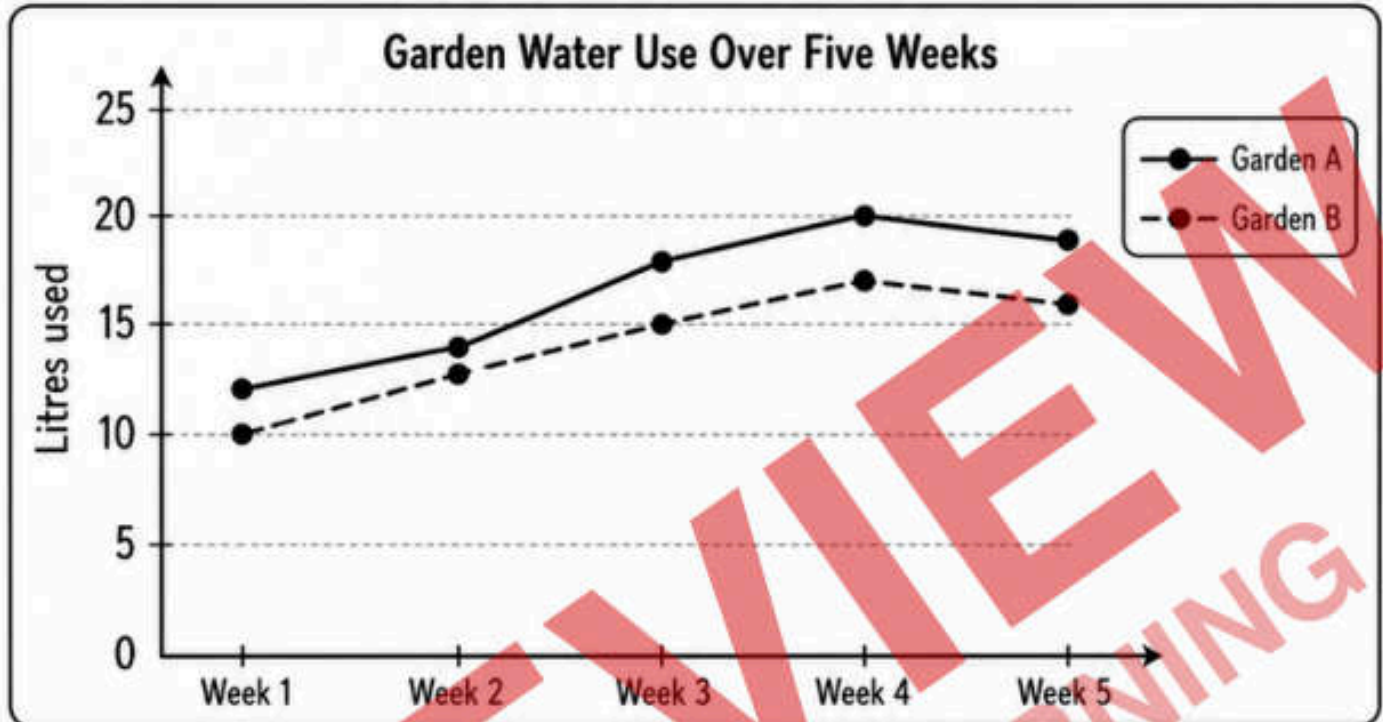
Eco Club Data Challenge

Assessment page 2



Name: _____

Instructions: Use evidence from the display and choose suitable data collection methods.



7. Which garden used more water in Week 4?

8. How much did Garden A increase from Week 1 to Week 4?

9. What was the difference between the gardens in Week 5?

10. Describe one trend shown in the line graph.

11. Why is a line graph suitable for this data?

12. Write one fair survey question the Eco Club could ask about improving the school garden.

13. Would your survey data be categorical or numerical? Explain.



Eco Club Data Challenge



Assessment page 1

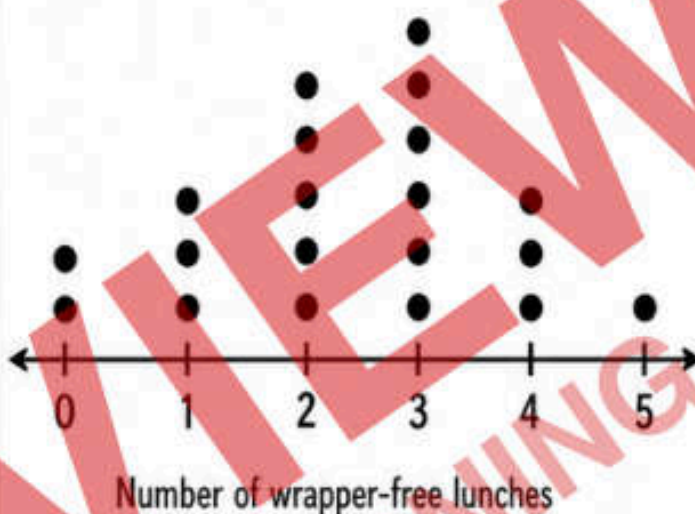
Name: **ANSWERS**

Instructions: Show your thinking and use evidence from the data.

Lunch Waste Survey

Waste type	Number of students
Compost	18
Recycling	11
Landfill	13
Wrapper-free	8

Wrapper-free Lunches Last Week



1. Is the waste type data categorical or numerical? Explain.

Categorical, because the responses are groups or categories.

2. How many students were surveyed altogether?

50 students

3. Which waste type had the greatest number of students?

Compost

4. What is the difference between Compost and Wrapper-free?

10 students

5. What number of wrapper-free lunches was most common?

3 wrapper-free lunches

6. How many students had 4 or 5 wrapper-free lunches?

4 students



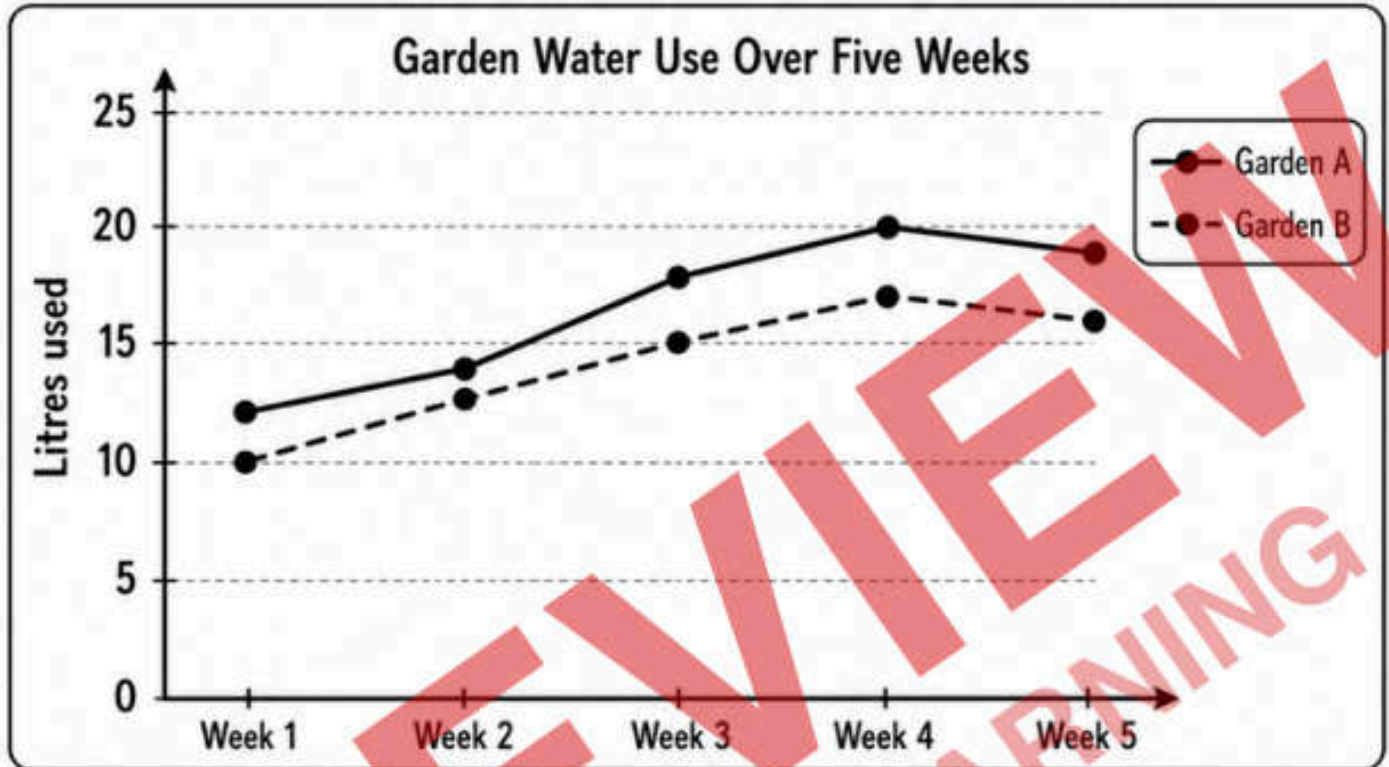
Eco Club Data Challenge

Assessment page 2



Name: **ANSWERS** _____

Instructions: Use evidence from the display and choose suitable data collection methods.



7. Which garden used more water in Week 4?

Garden A

8. How much did Garden A increase from Week 1 to Week 4?

8 litres

9. What was the difference between the gardens in Week 5?

3 litres

10. Describe one trend shown in the line graph.

Sample: Both gardens increased until Week 4, then decreased in Week 5.

11. Why is a line graph suitable for this data?

A line graph is suitable because the data shows change over time.

12. Write one fair survey question the Eco Club could ask about improving the school garden.

Sample: Which garden improvement should our class choose first?

13. Would your survey data be categorical or numerical? Explain.

Categorical, because students would choose from options.

Data and Interpretation Year 5 Rubric

AC9M5ST01, AC9M5ST02, AC9M5ST03

Criteria	BEGINNING	DEVELOPING	ACHIEVING	CONFIDENT	EXCEEDING
Data types	Needs support to identify data types.	Sorts simple categorical and numerical data.	Classifies common data types accurately.	Explains discrete and continuous numerical data.	Justifies classifications using precise examples.
Data collection	Needs support to ask survey questions.	Writes a simple question with limited options.	Writes clear survey questions and response options.	Plans fair collection methods for a purpose.	Refines questions to reduce bias and improve usefulness.
Data displays	Needs support to read displays.	Reads simple values from graphs.	Creates and reads suitable displays accurately.	Chooses suitable displays and explains why.	Compares display choices and improves representations.
Interpretation	Gives limited answers from data.	Identifies obvious features of data.	Uses evidence to answer questions.	Compares values, trends and differences clearly.	Makes justified conclusions and notes limitations.
Communication	Responses are unclear or incomplete.	Uses some correct data language.	Shows working and labels mostly clearly.	Communicates reasoning with accurate vocabulary.	Gives precise, organised and evidence-based explanations.

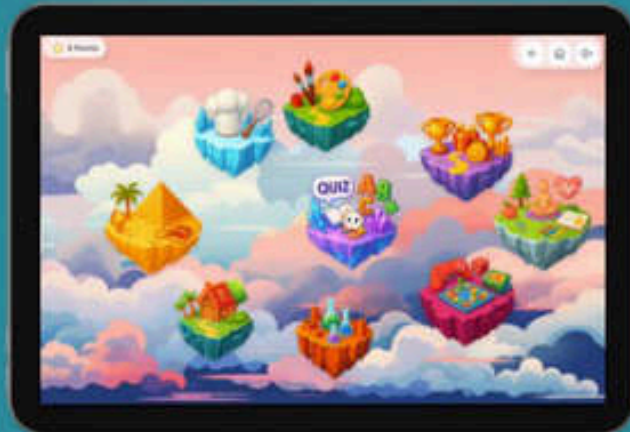
Data and Interpretation

Year 5



Data and Interpretation Quiz





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Line Graphs - Year 5

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Quiz: Line Graphs	
Assessment: Community Bike Share Line Graph Assessment	
Rubric: Line Graphs Rubric	

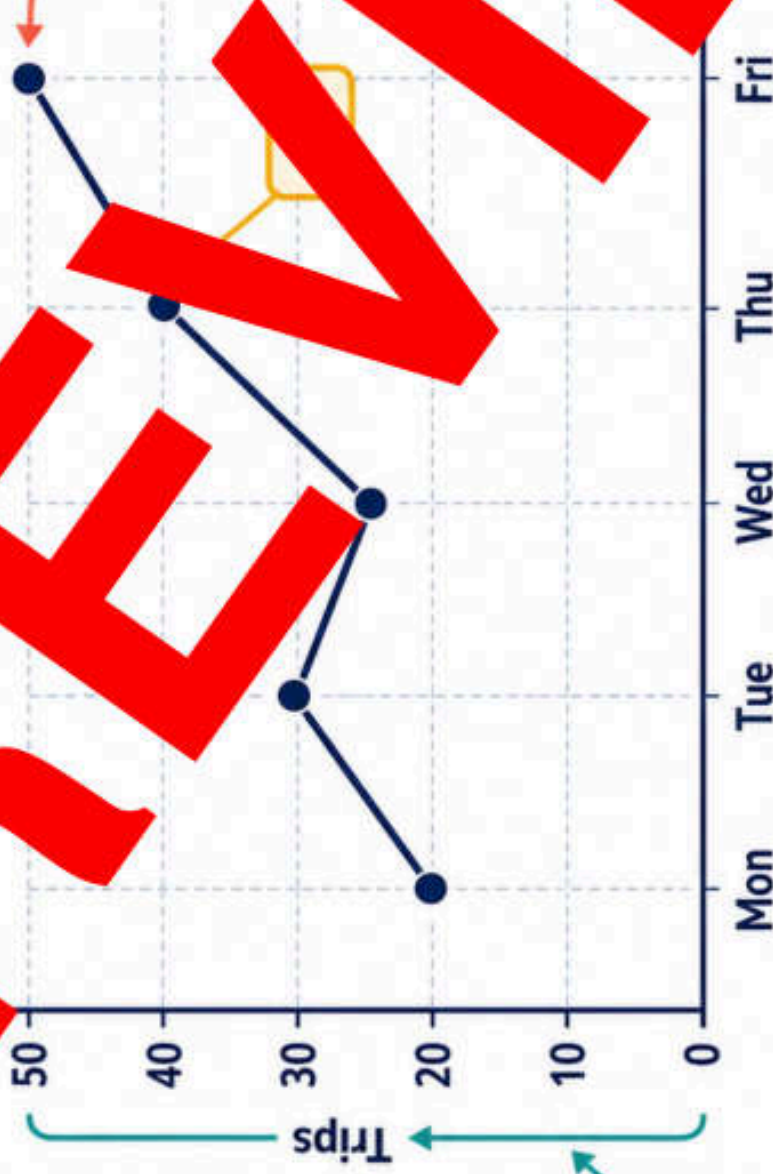


Line Graphs: Change Over Time

Bike Hire Trips

Title

Data point



Vertical axis

Scale

Horizontal axis



Read exact values.



Describe the trend.



Summarise conclusions
and data.

Line Graphs Reference Card

1

1. Read the title

What is changing over time?



2

2. Check the axes and units

What does each axis measure?



3

3. Read the scale

Are the intervals equal?



4

4. Find each point

Trace across and read each value.



5

5. Describe the trend

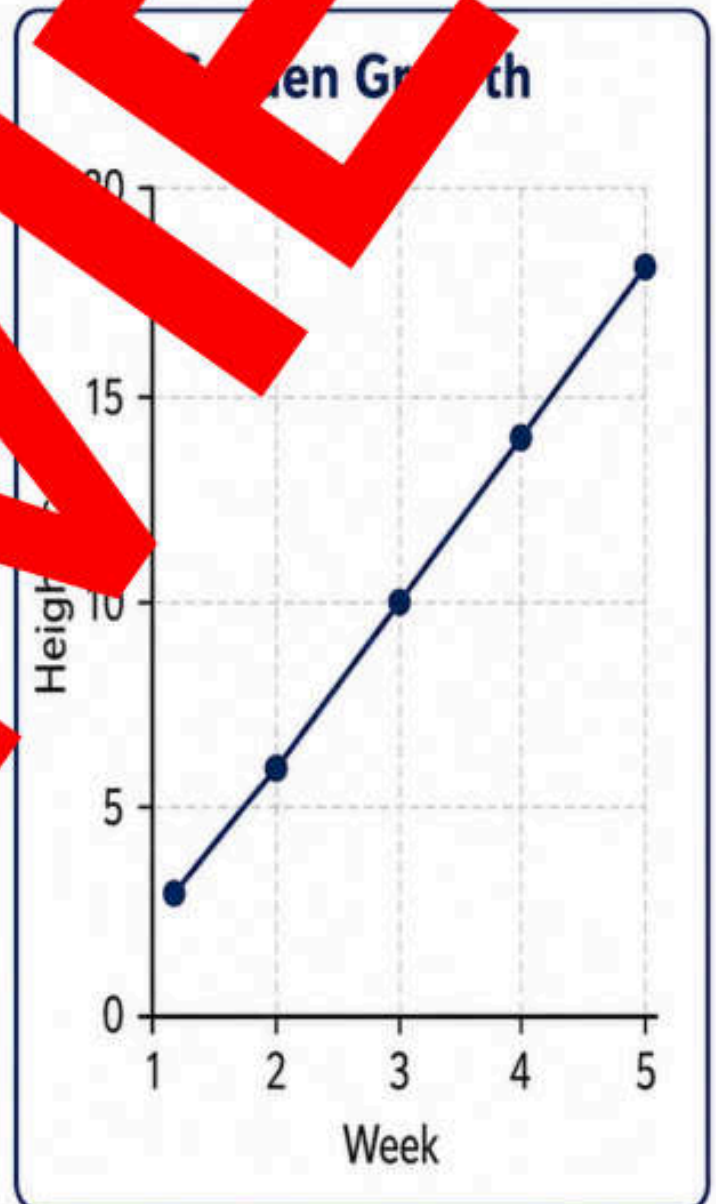
Is it increasing, decreasing, or fluctuating?



6

6. Make a conclusion

Use data as evidence.

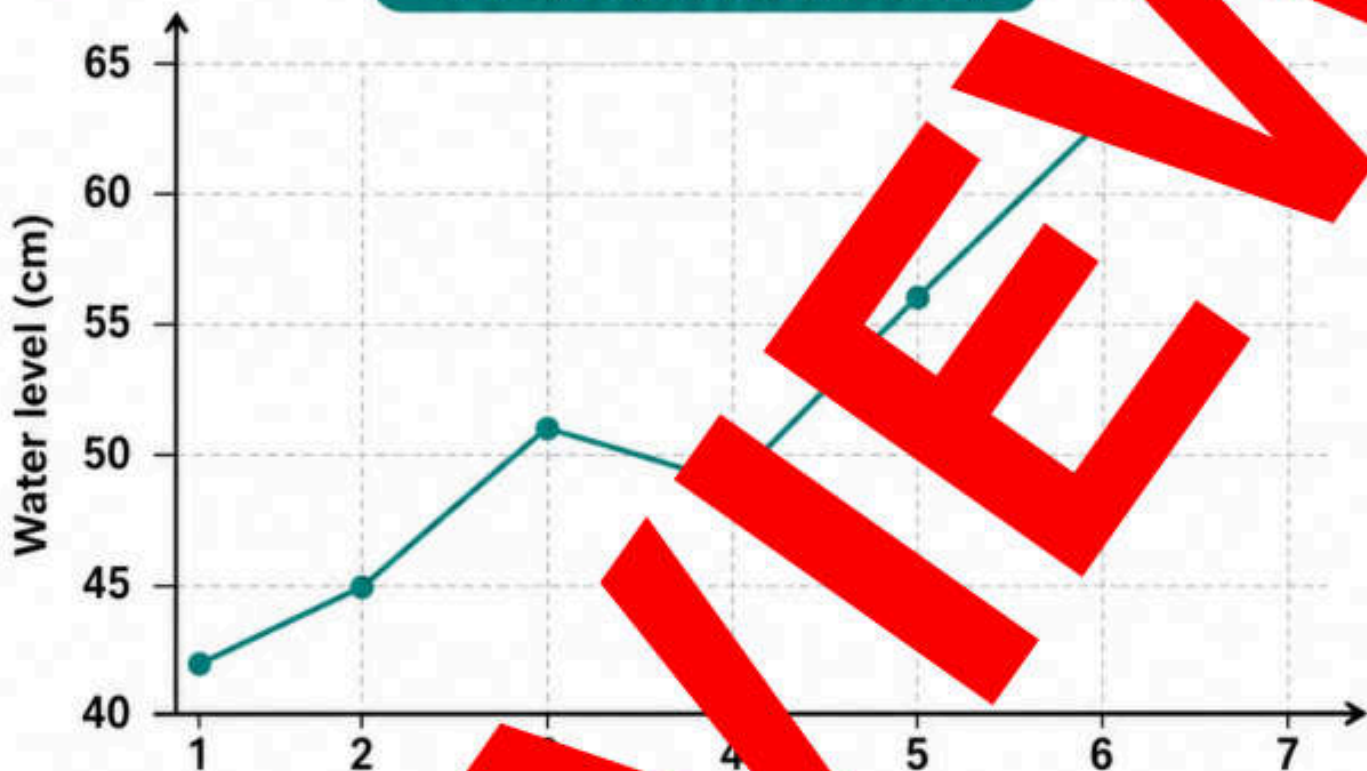




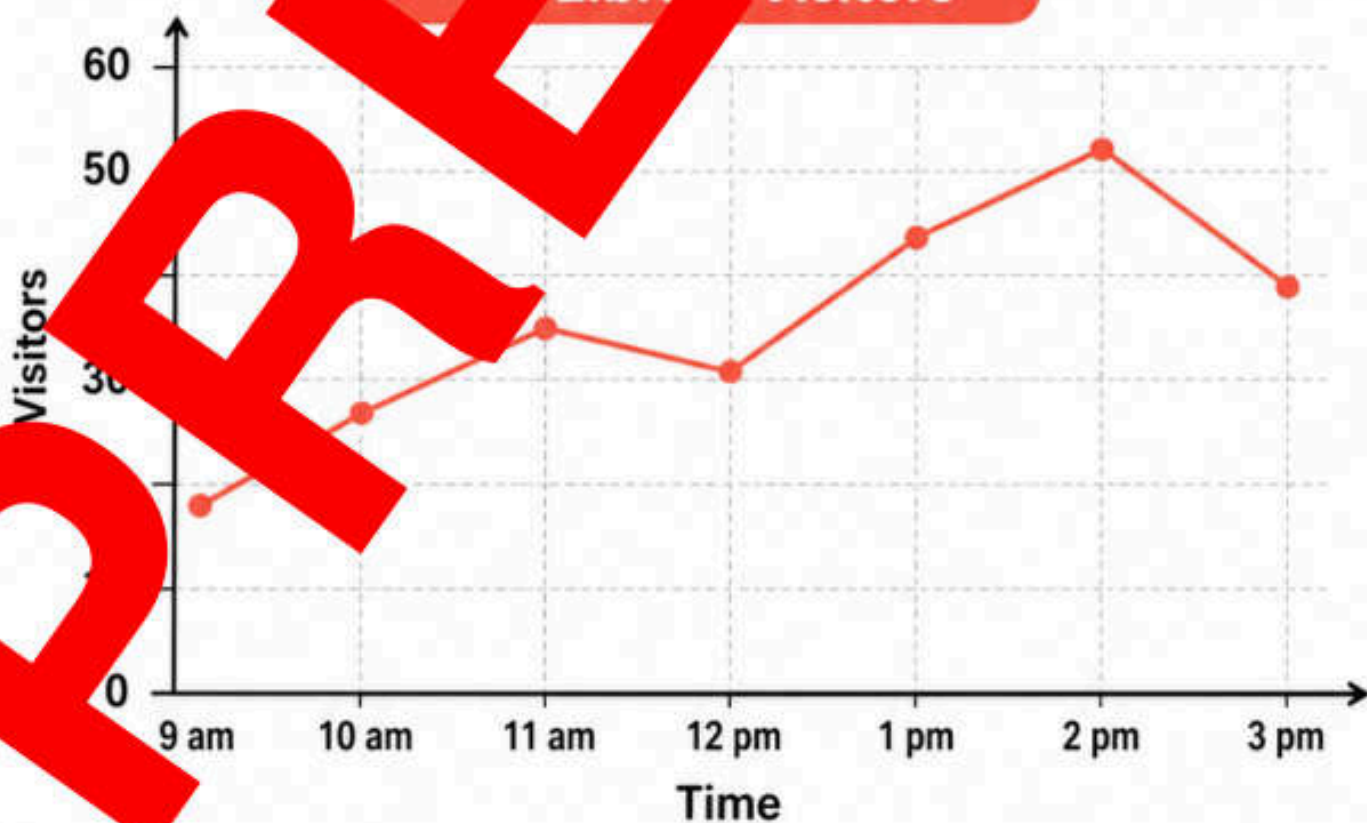
Trend Detectives: Graph Cards A



A. Creek Water Level

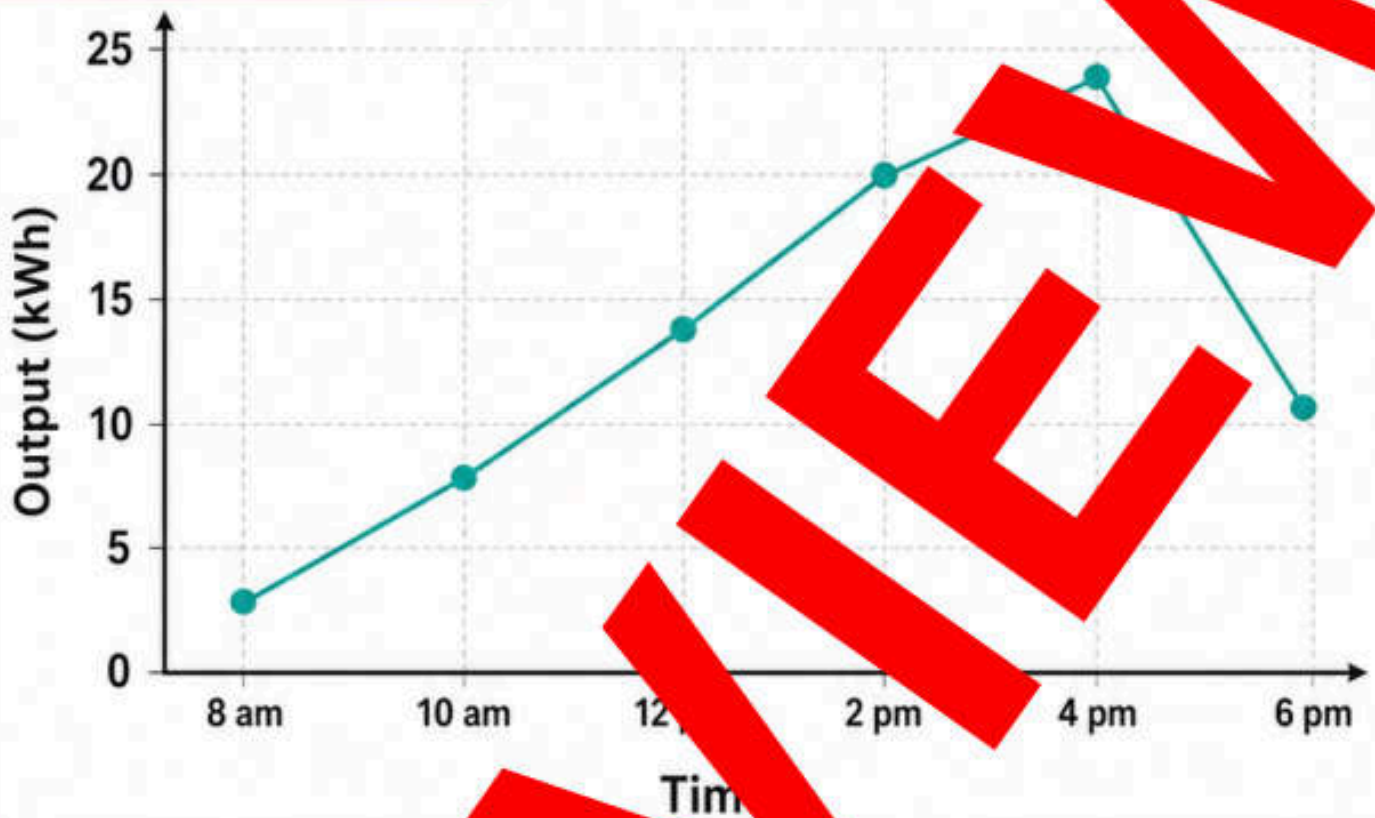


B. Library Visitors

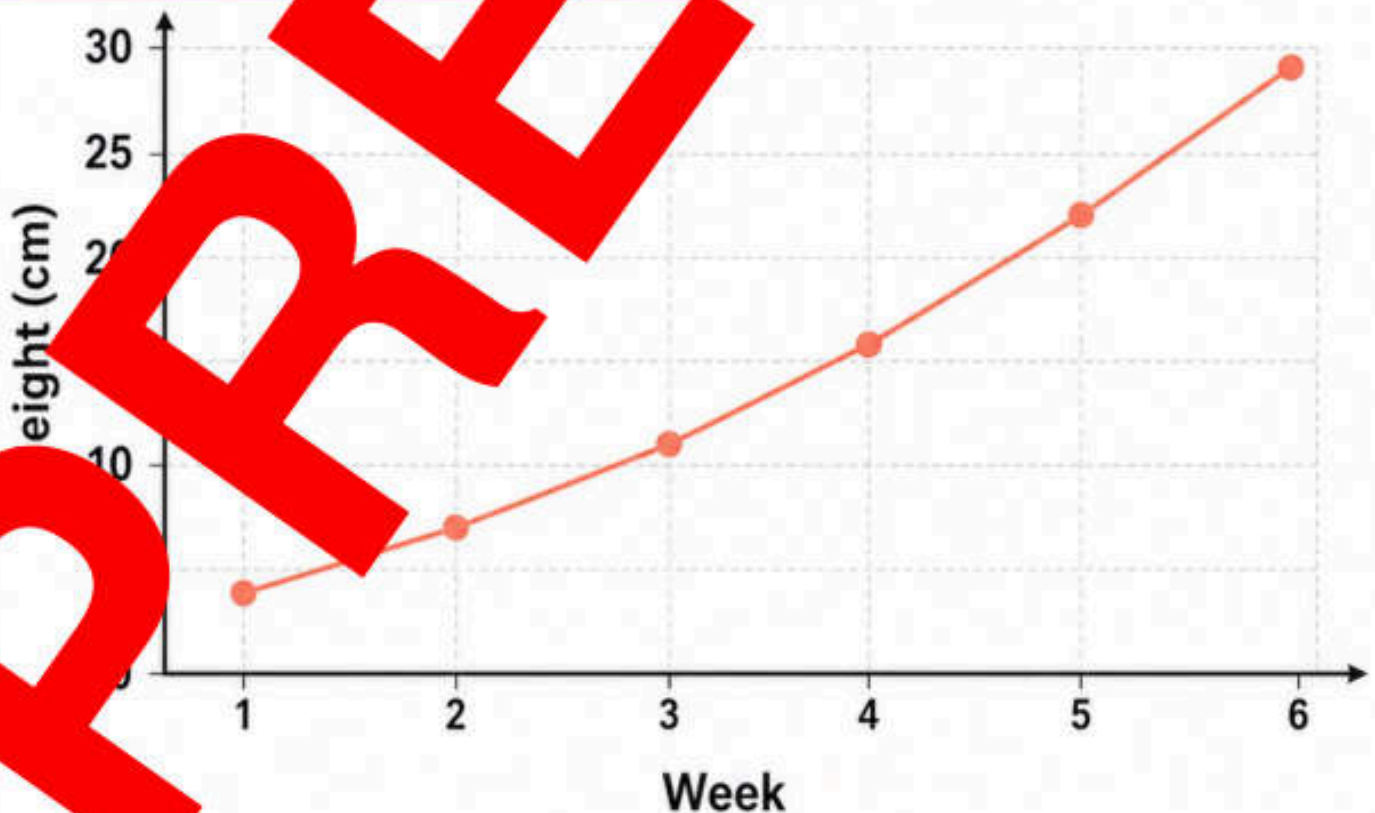


Trend Detectives: Graph Cards

C. Solar Output



D. School Garden Growth



Trend Detectives: Question Cards A

A1

Graph A: What was the creek water level on Day 5?

A2

Graph A: Between which two consecutive days was the greatest rise? Calculate the rise.

B1

Graph B: What time were library visitors highest? Give a value.

B2

Graph B: Mia says, 'Visitor numbers generally increased from 9 am to 2 pm.' Is she correct? Justify your conclusion with two data values.

Trend Detectives: Question Cards C-D



C1

Graph C: Describe the turning point after 4 pm.

C2

Graph C: Compare the car output at 10 am and 4 pm. What is the difference?



D1

Graph D: Between two consecutive weeks, what was the greatest increase? Calculate it.

D2

Graph D: Write one evidence statement that proves the plants grew overall.

Graph Story Match: Story Cards

A

A. "Campsite Temperature: The morning began cool. The temperature rose steadily to a mid-afternoon high, then fell towards evening."



B. "Bus Passengers. Passenger numbers rose over the first two stops, dipped at the next, then rose to their highest point."



C. "Plant Height. The seedling grew by the same amount each week for four weeks."



D

D. "Water-Tank Level: The level fell steadily for five readings, then rose sharply after the tank was refilled."

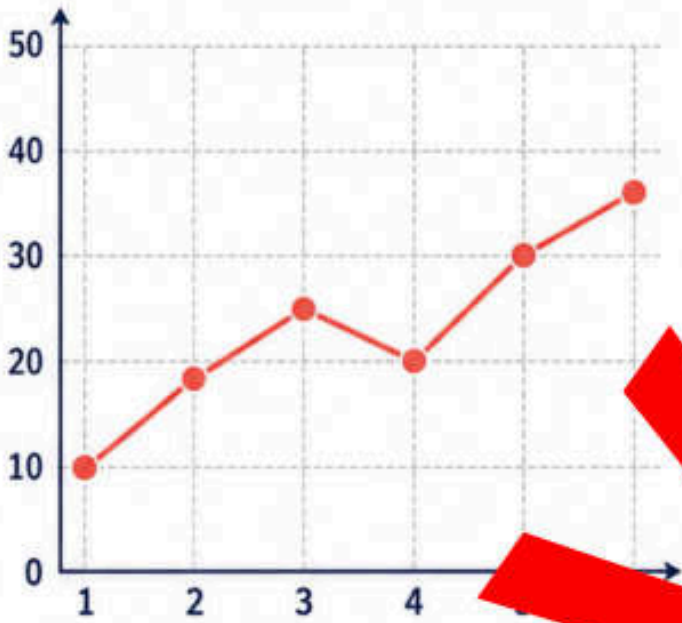


Cut out the cards. Match each story to an unlabelled graph.

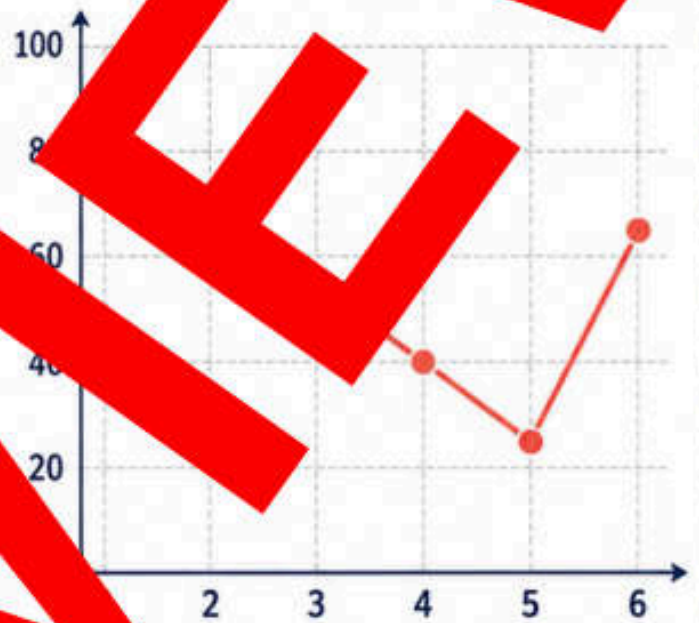
Graph Story Match: Graph Cards



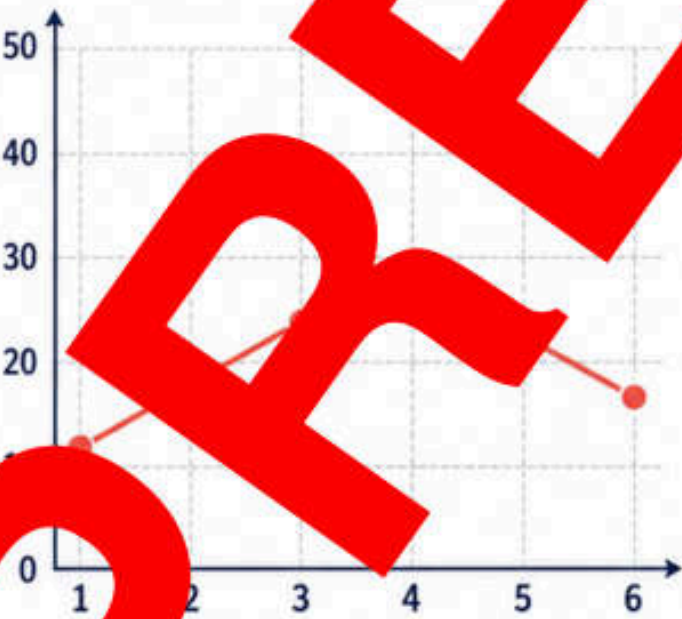
Graph 1



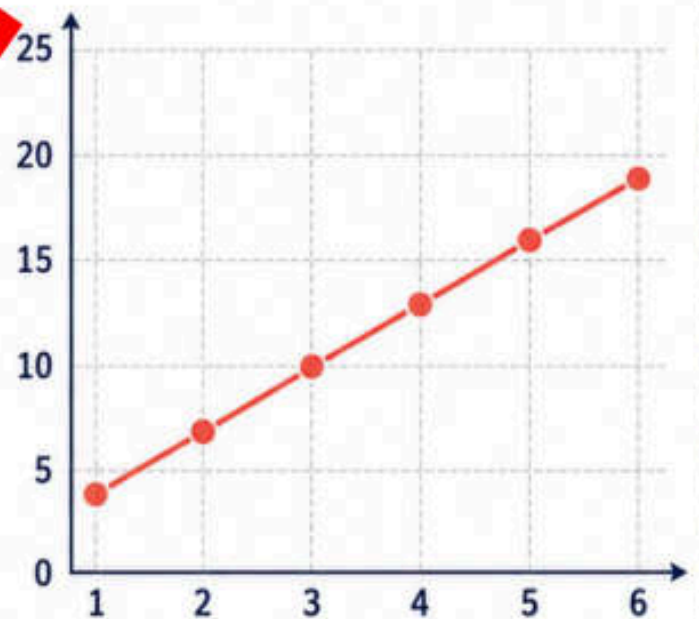
Graph 2



Graph 3



Graph 4



Match each graph to Story A, B, C or D.

Graph Story Match: Recording and Reasoning Mat

Name: _____

Date: _____

Story	Graph	Evidence and Reasoning
A		
B		
C		
D		

Challenge

Choose a graph. Explain the turning point or trend that proved your choice.

Line Graph Investigation Lab: Data Cards

1. Canteen Smoothies



Day	Mon	Tue	Wed	Thu	Fri	Sat
Smoothies sold	28	35	42	44	52	47



Create a line graph. Then describe the trend and support one conclusion with data.



2. Playground Temperature (°C)



	8 am	10 am	12 pm	2 pm	4 pm	6 pm
Temperature (°C)	14	18	23	27	25	19



Create a line graph. Then describe the trend and support one conclusion with data.

3. Bike Rack Use



Time	8 am	9 am	10 am	11 am	12 pm	1 pm	2 pm	3 pm
Bikes	12	26	31	35	38	35	33	18



Create a line graph. Then describe the trend and support one conclusion with data.

4. Rainfall (mm)



Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Rainfall (mm)	4	0	7	12	5	2	9



Create a line graph. Then describe the trend and support one conclusion with data.



Line Graph Investigation Lab: Reusable Graph Mat



Title

Horizontal axis

Vertical axis

Interval

Scale



Graph check

- ☐ Clear title
- ☐ Axes labelled
- ☐ Interval shown

- ☐ Equal scale intervals
- ☐ Points plotted accurately
- ☐ Points joined in order





Line Graph Investigation Lab

Discussion Challenges



1

What is the highest value? When does it occur?



2

What is the lowest value? When does it occur?



3

Between which two points is the steepest change? Calculate the change.



Describe the overall trend and any turning point.



5

Write one conclusion and support it with two data values.



6

What extra data would help you make a stronger conclusion?

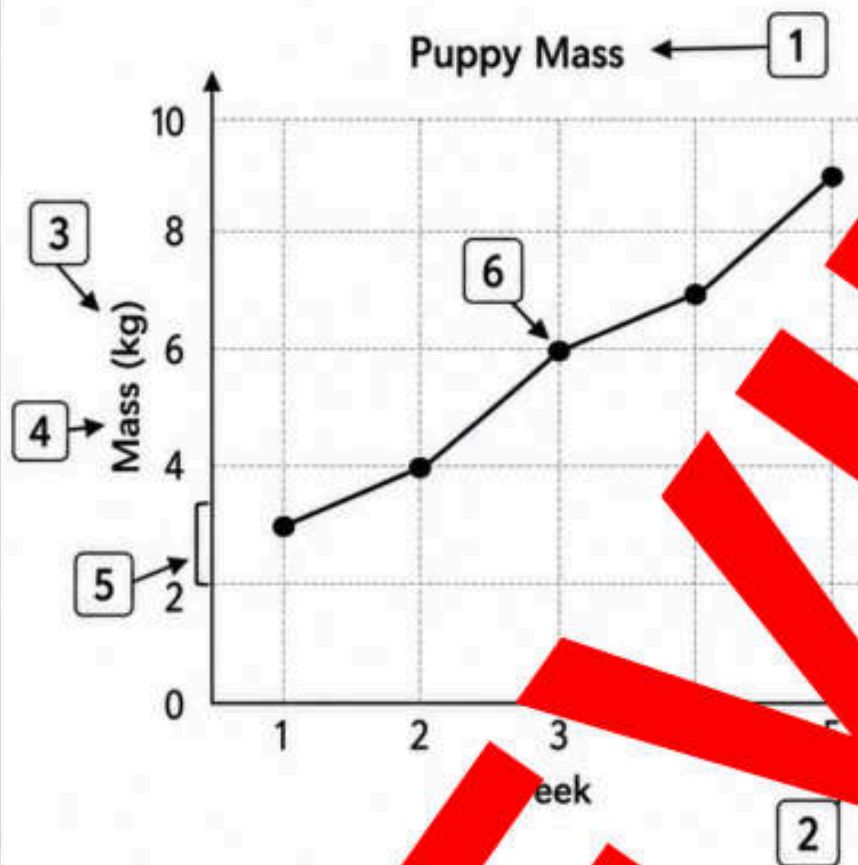


Name: _____

Date: _____

Worksheet: Line Graph Essentials

1. Name the graph features



title • horizontal axis • vertical axis • unit • scale • data point

2. Choose a suitable scale

A graph must show values up to 40. Circle the most sensible equal interval: 1 5 25

3. Read exact values

a. What was the puppy's mass in Week 2? _____

b. What was the puppy's mass in Week 5? _____

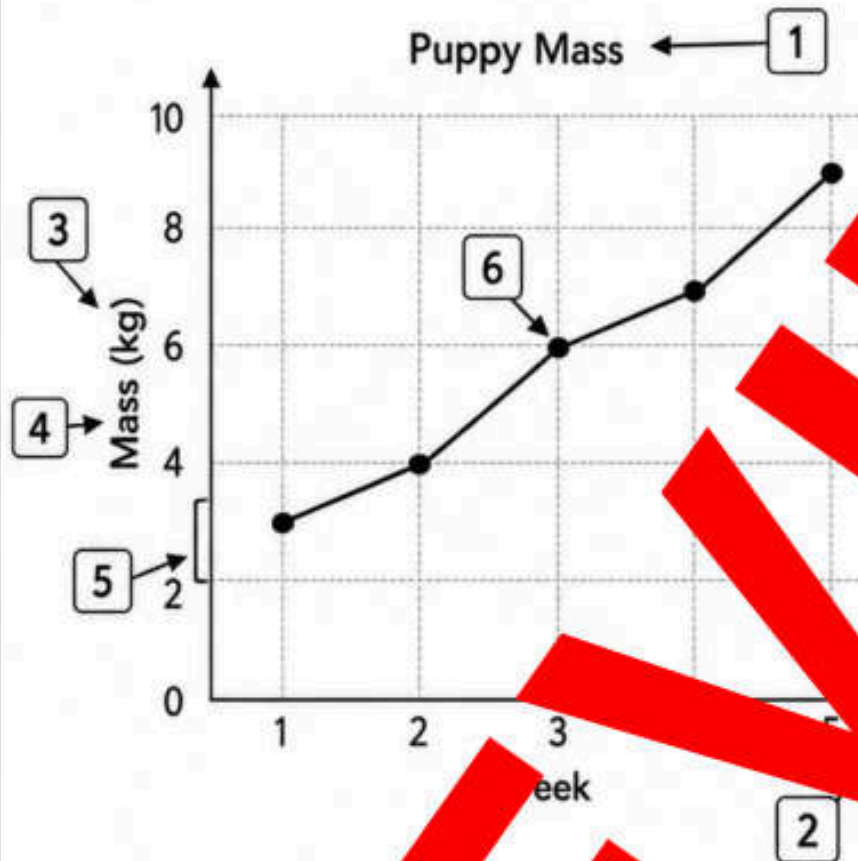
How much did the puppy's mass increase from Week 3 to Week 5? _____

Name: ANSWERS

Date: _____

Worksheet: Line Graph Essentials

1. Name the graph features



1. title

2. horizontal axis

3. _____

vertical axis

5. _____

scale

6. _____

data point

title • horizontal axis • vertical axis • unit • scale • data point

2. Choose the scale

A graph must show values up to 40. Circle the most sensible equal interval: 1 5 25

3. Read exact values

a. What was the puppy's mass in Week 2? 4 kg

b. What was the puppy's mass in Week 5? 9 kg

How much did the puppy's mass increase from Week 3 to Week 5? 3 kg

Worksheet: Reading and Comparing Line Graphs – Page 1

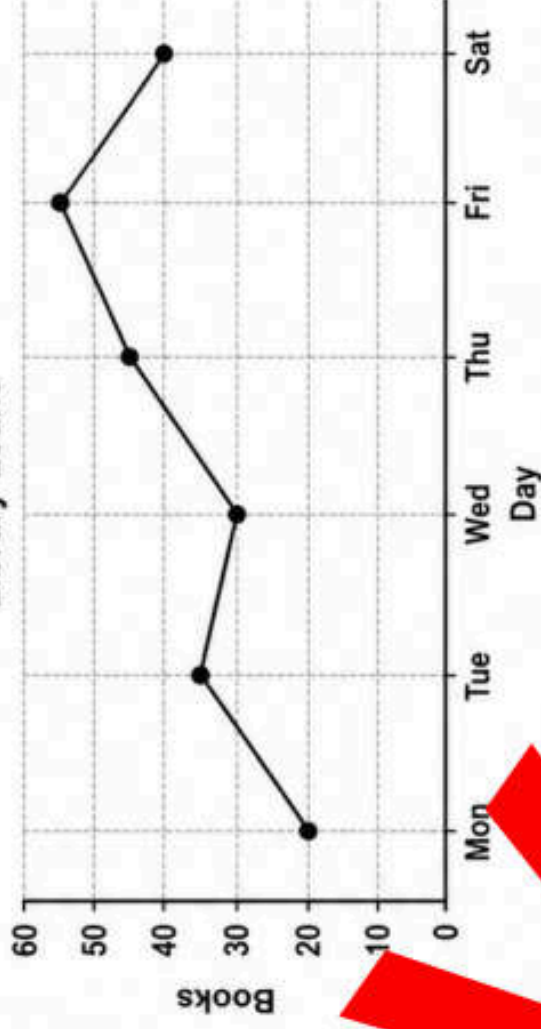
Name: _____

Date: _____

Morning Temperature



Library Loans



1. What was the temperature at 10 am?
2. When was the temperature highest? Give the value.
3. Describe the change from 12 pm to 1 pm.
4. How many books were loaned on Thursday?
5. On which day were the fewest books loaned? Give the value.
6. How did library loans change overall from Monday to Saturday? Calculate the change.

Worksheet: Reading and Comparing Line Graphs – Page 1

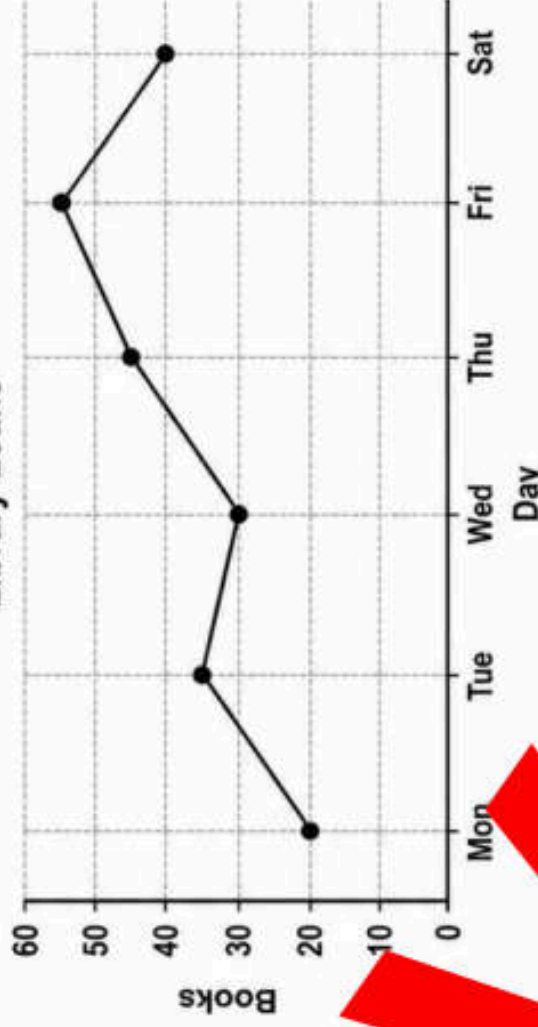
Name: _____

Date: _____

Morning Temperature



Library Loans



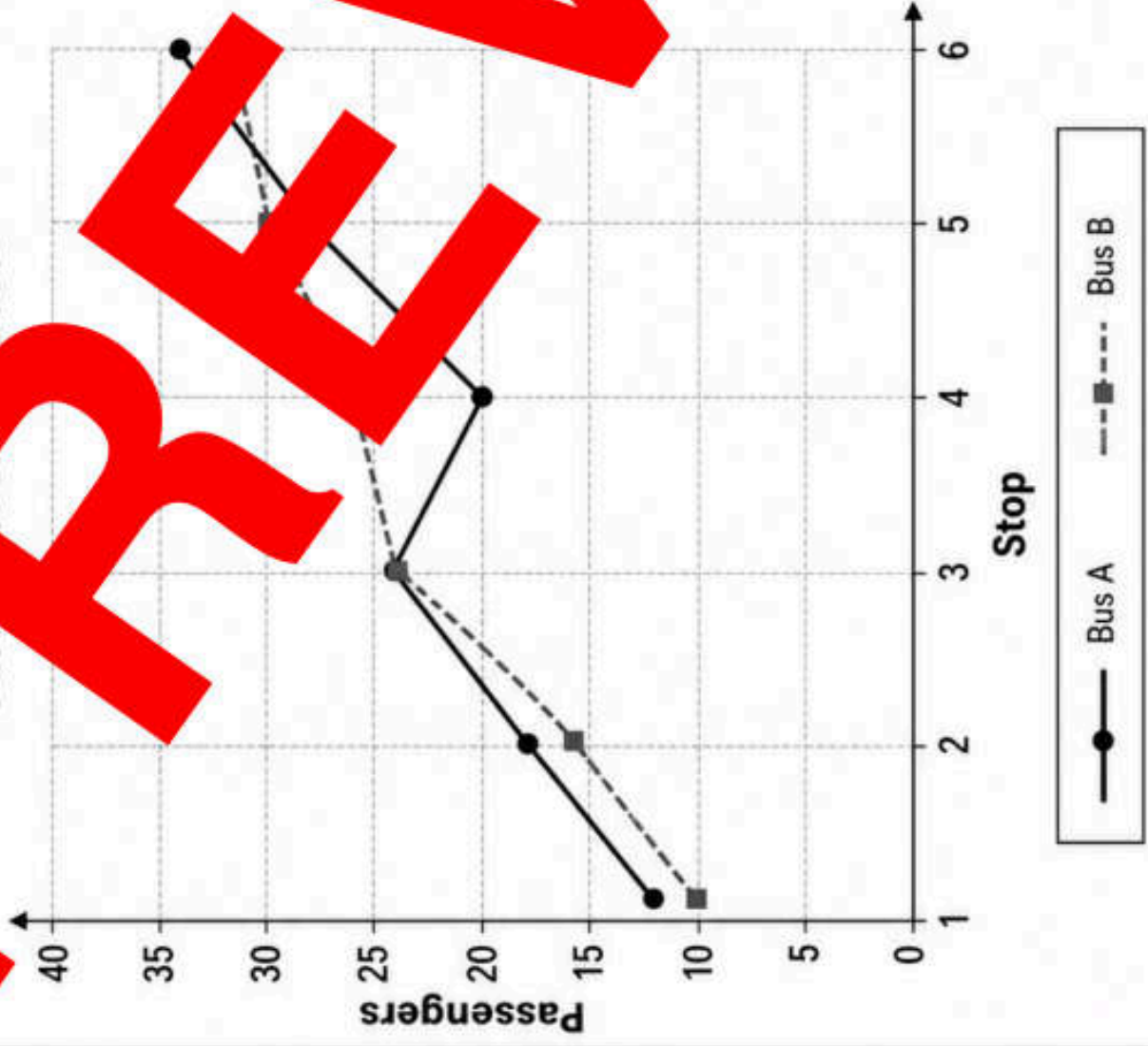
- What was the temperature at 10 am?
- **20°C**
- When was the temperature highest? Give the value.
- **11 am; 25°C**
- Describe the change from 12 pm to 1 pm.
- **It decreased from 20°C to 15°C, a decrease of 5°C.**
- How many books were loaned on Thursday?
- **45 books**
- On which day were the fewest books loaned? Give the value.
- **Monday; 20 books**
- How did library loans change overall from Monday to Saturday? Calculate the change.
- **Loans increased from 20 to 40 books, an overall increase of 20.**

Worksheet: Reading and Comparing Line Graphs – Page 2

Name _____

Date: _____

Passengers on Buses



1. How many passengers were on Bus A at Stop 2?

2. How many passengers were on Bus B at Stop 4?

3. At which stop did both buses have the same number of passengers?

4. At Stop 5, which bus had more passengers, and by how many?

5. Between which stops did Bus A have its greatest increase?

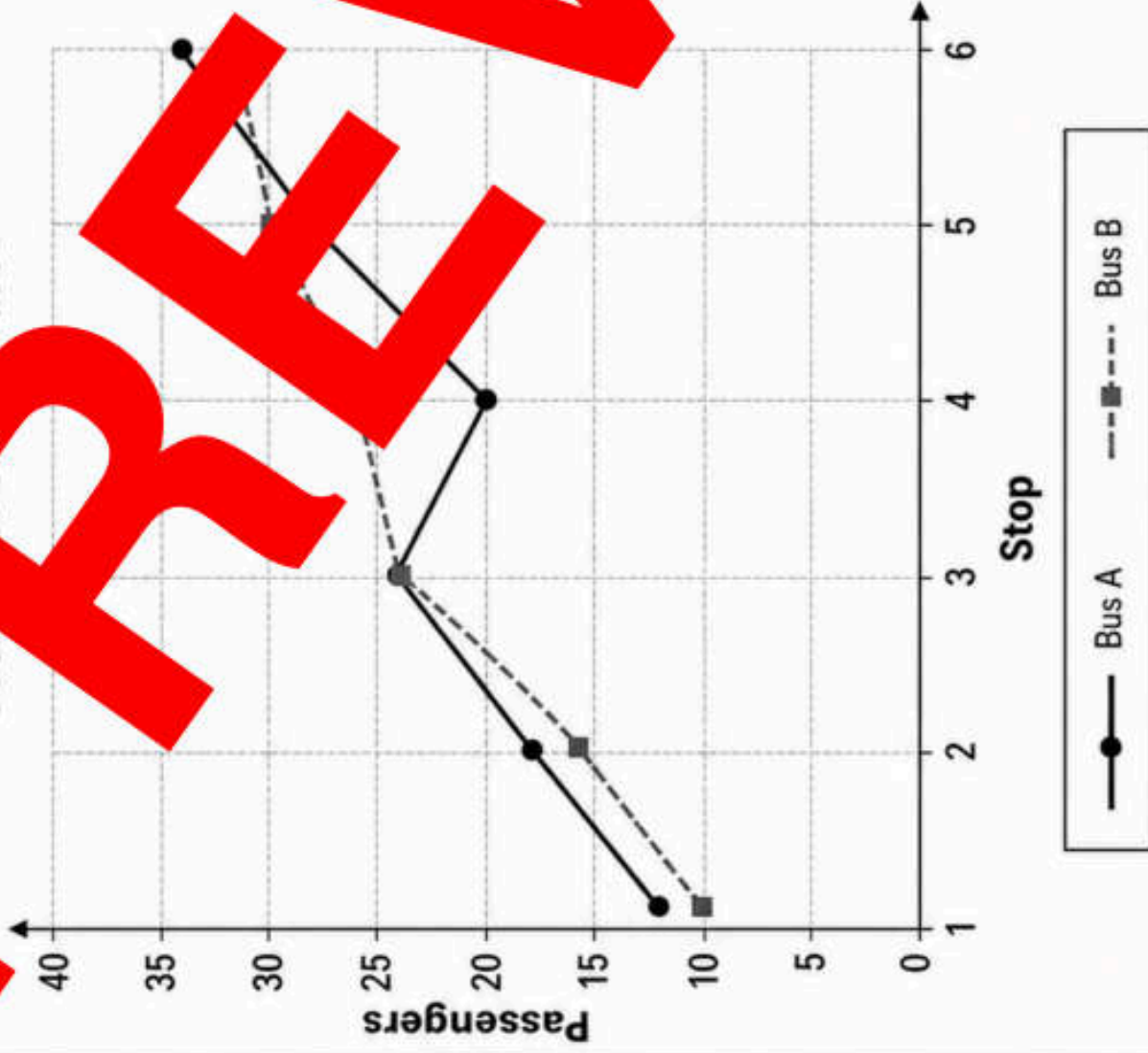
6. Compare the overall change in passengers for Bus A and Bus B from Stop 1 to Stop 6.

Worksheet: Reading and Comparing Line Graphs – Page 2

Name _____

Date: _____

Passengers on Buses



1. How many passengers were on Bus A at Stop 2?

18 passengers

2. How many passengers were on Bus B at Stop 4?

22 passengers

3. At which stop did both buses have the same number of passengers?

Stop 3

4. At Stop 5, how many passengers did each bus have, and by how many?

Bus A: 30 passengers, Bus B: 30 passengers

5. Between which two stops did Bus A have its greatest increase?

Stops 4 to 5, an increase of 8

6. Compare the overall change for Bus A and Bus B from Stop 1 to Stop 6.

Bus A: +25, Bus B: +22. Both increased, but the increase for Bus A was greater.

Name: _____

Date: _____

Worksheet: Making Inferences from Trends



1. In which month were visits highest? Give the

2. How much did visits increase from January to July?

3. After which month did the downward trend begin?

4. What seasonal pattern might the graph suggest? Use two data values as evidence.

5. Draw one supporting conclusion about visits from May to September.

6. Can this graph prove why visits fell after July? Explain.

Name: ANSWERS

Date: _____

Worksheet: Making Inferences from Trends



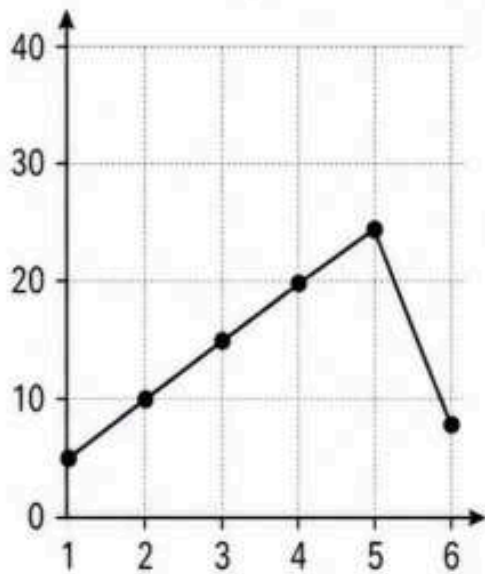
1. In which month were visits highest? Give the number of visits.
July; 240 visits.
2. How much did visits increase from January to July?
120 visits (240 - 120)
3. After which month did the downward trend begin?
After July.
4. What seasonal pattern might the graph suggest? Use two data values as evidence.
More visits in the middle of the year had 240, compared with 120 in January.
5. Draw one supporting conclusion about visits from May to September.
Visits rose from 190 in May to 240 in July, then fell to 200 in September.
6. Can the graph prove why visits fell after July? Explain.
The graph shows what changed, but it does not give a cause.

Worksheet: Missing Labels and Context Clues - Part 1

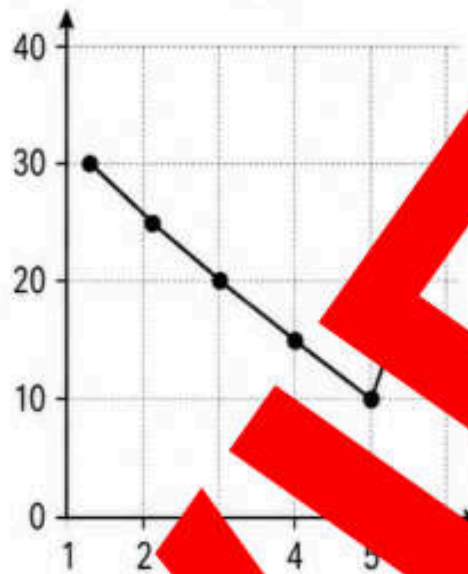
Name: _____

Date: _____

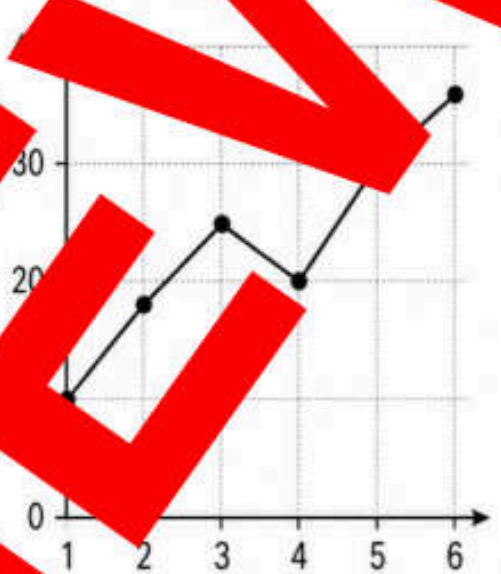
Graph A



Graph B



Graph C



Match the contexts

1. A plant grew steadily, then was cut back and then regrew.
2. A water tank drained steadily, then was refilled.
3. Bus passenger numbers rose, then fell, then rose to their highest point.

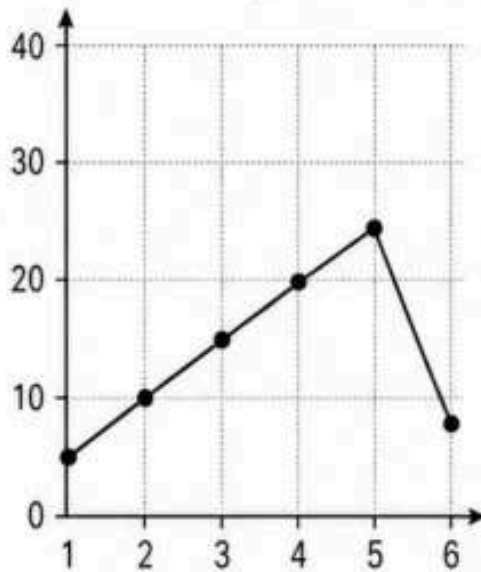
Context	Match the graph and axis labels	Evidence from the shape
1		
2		
3		

Worksheet: Missing Labels and Context Clues – 1

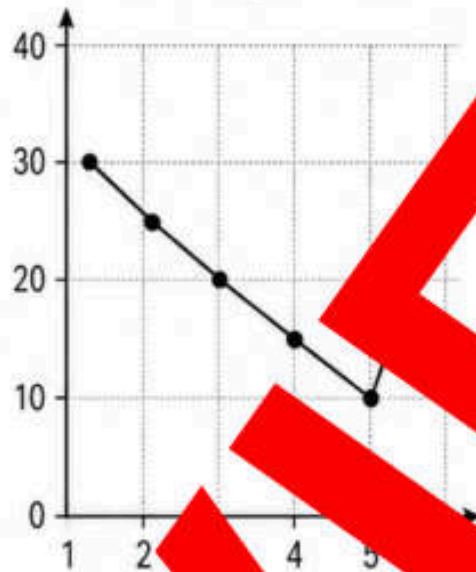
Name: ANSWERS

Date: _____

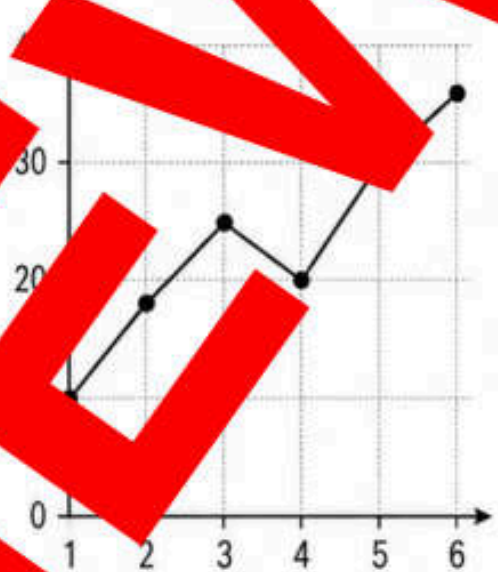
Graph A



Graph B



Graph C



Match the contexts

1. A plant grew steadily, then was cut back sharply.
2. A water tank drained steadily, then was refilled.
3. Bus passenger numbers rose, dipped, then rose to their highest point.

Context	Graph	Label and axis labels	Evidence from the shape
1	A	Plant Height Over Time; x: Reading; y: Height (cm)	Steady rise, then a sharp fall.
2	B	Water-Tank Level; x: Reading; y: Level (L)	Steady fall, then a sharp rise.
3	C	Bus Passengers; x: Stop; y: Passengers	Rise, dip, then rise to the highest point.

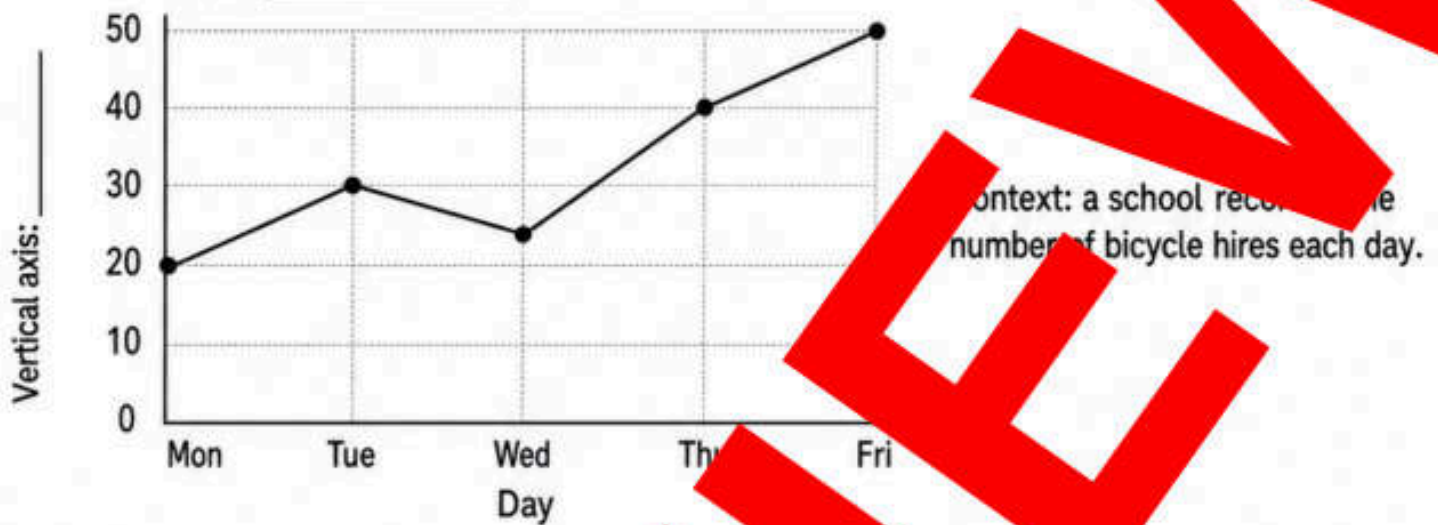
Name: _____

Date: _____

Worksheet: Missing Labels and Context Clues – Page 2

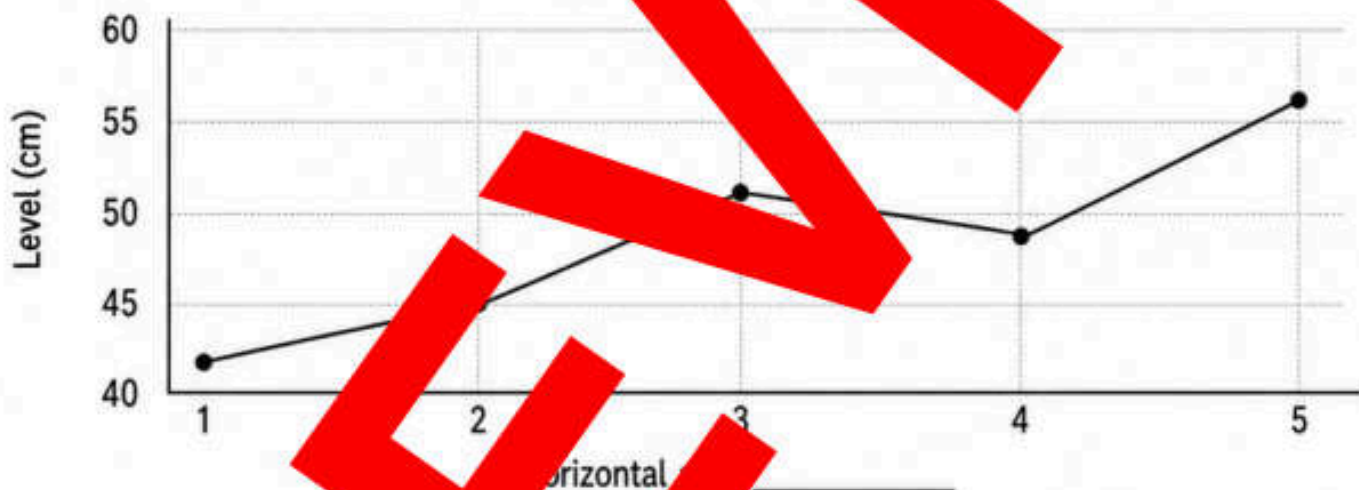
Graph A:

Title: _____



Graph B:

Creek Water Level

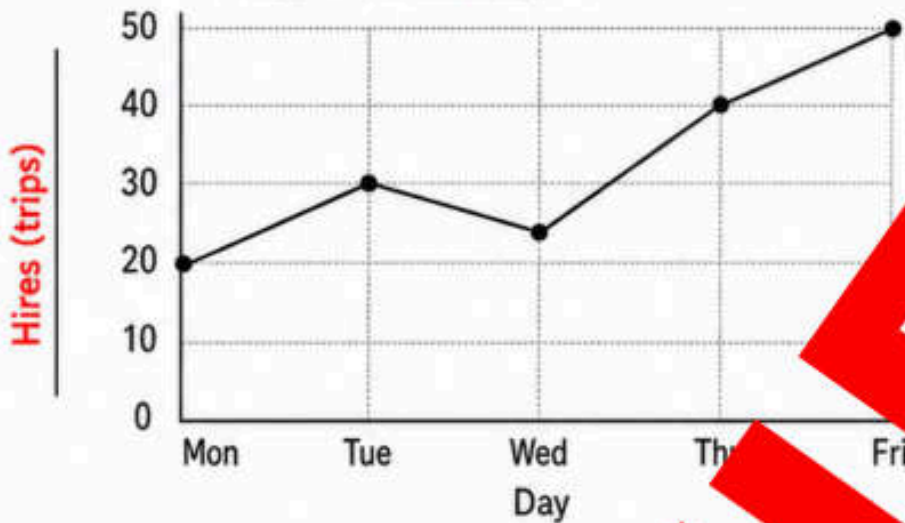


1. Write the most useful title for Graph A.

2. Complete Graph A's vertical-axis label and unit.

3. Complete Graph B's horizontal-axis label.

4. Why do titles, labels and units matter when interpreting a line graph?

Worksheet: Missing Labels and Context Clues – Page 2**Graph A:**Title: School Bicycle Hires

Context: a school records the number of bicycle hires each day.

Graph B:

Creek Water Level



1. Write the most useful title for Graph A.

School Bicycle Hires

2. Complete Graph A's vertical-axis label and unit.

Hires (trips)

3. Complete Graph B's horizontal-axis label.

Day

4. Why do titles, labels and units matter when interpreting a line graph?

They show what is measured, when it is measured and the unit used, so values can be interpreted correctly.

Worksheet: Constructing Line Graphs – Page 1

Name: _____

Date: _____

Community Garden Water Use

Use the table to construct a complete line graph.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Water used (L)	18	22	27	25	31	36	



When you finish:

- ☐ Give the graph a clear title
- ☐ Label both axes
- ☐ Show litres
- ☐ Choose equal scale intervals
- ☐ Plot every point accurately
- ☐ Join points in time order

Worksheet: Constructing Line Graphs – Page 1

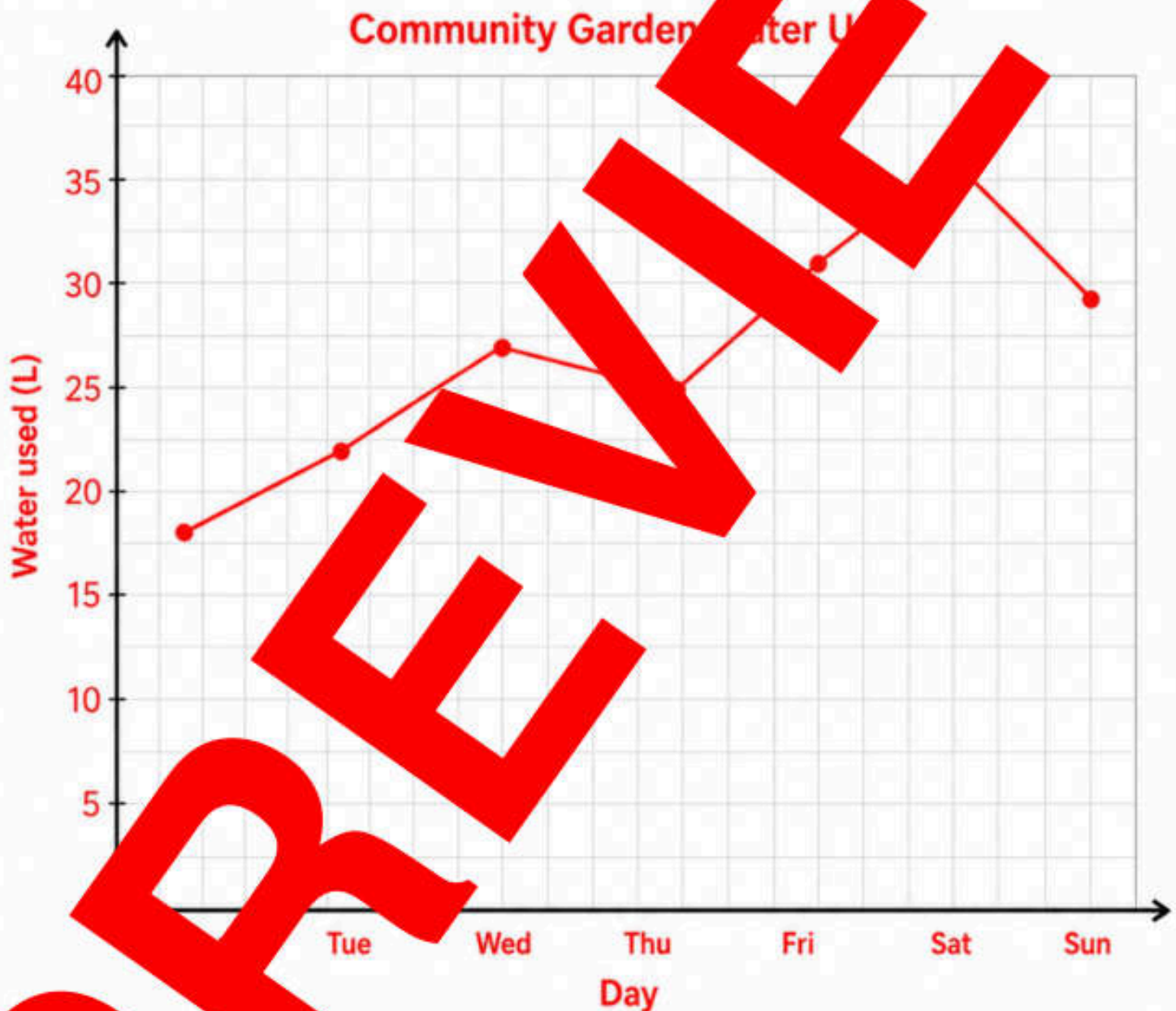
Name: ANSWERS

Date: _____

Community Garden Water Use

Use the table to construct a complete line graph.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Water used (L)	18	22	27	25	31	36	29



You finished

- ☒ A clear title
- ☒ Both axes
- ☒ Show litres
- ☒ Choose equal scale intervals
- ☒ Every point accurately
- ☒ Join points in time order

Worksheet: Constructing Line Graphs – Page 2

Name: _____

Date: _____

Bike Rack Use

Use the table to construct a line graph, then interpret it.

Time	8 am	9 am	10 am	11 am	12 pm	1 pm	2 pm	3 pm
Bikes	12	26	31	24	38	46		



1. At what time was bike-rack use highest?

2. How much did bike-rack use increase from 11 am to 1 pm?

3. Between which times was the greatest decrease? Calculate it.

4. Describe the overall change from 8 am to 3 pm and mention the fluctuations.

Worksheet: Constructing Line Graphs – Page 2

Name: ANSWERS

Date: _____

Bike Rack Use

Use the table to construct a line graph, then interpret it.

Time	8 am	9 am	10 am	11 am	12 pm	1 pm	2 pm	3 pm
Bikes	12	26	31	24	38	46	32	18



1. At what time was bike-rack use at its highest?

1 pm; 46

2. How much did bike-rack use increase from 11 am to 1 pm?

22 (46 - 24)

3. Between what times was the greatest decrease? Calculate it.

1 pm to 2 pm; a decrease of 13 bikes.

4. Describe the overall change from 8 am to 3 pm and mention the fluctuations.

Overall, use rose from 12 to 18 bikes (+6), with several rises and falls.

Community Bike Share Line Graph Assessment – Page 1

Name: _____

Date: _____

Score: _____

Construct a complete line graph from the data. Choose and show a sensible equal scale.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Trips	36	48	52	45	68	80	92



Construct a line graph from the data.

- ☐ Near title
- ☐ Axes labelled
- ☐ Uniform scale intervals
- ☐ Even accurate points
- ☐ Points joined in order

Construction: ____ / 5

Community Bike Share Line Graph Assessment – Page 1

Name: ANSWERS

Date: _____

Score: _____

Construct a complete line graph from the data. Choose and show a sensible equal scale.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Trips	36	48	52	45	68	78	62



Construction: _____

- ☐ Title
- ☒ Both axes labelled
- ☒ Values shown
- ☐ Equal scale intervals
- ☐ Accurate points
- ☒ Points joined in order

Construction: 5 / 5

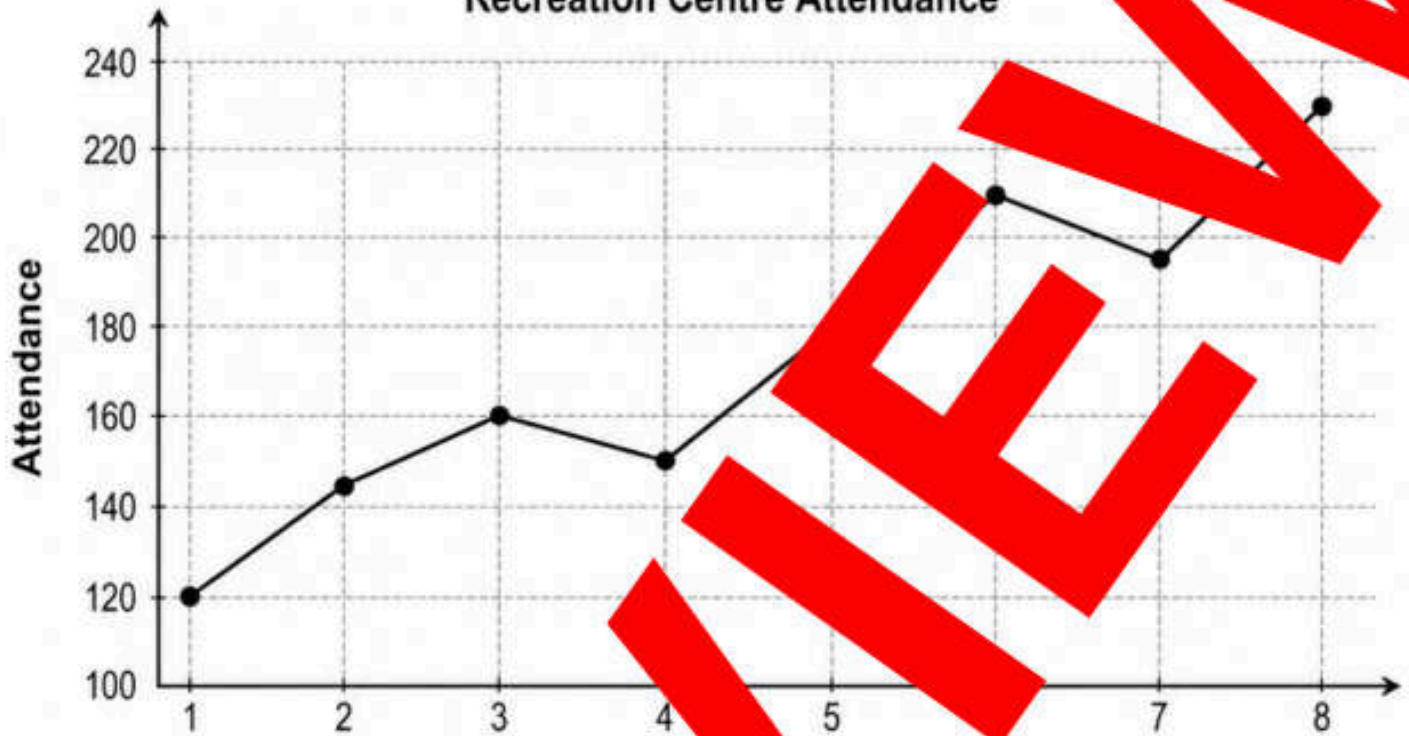
Community Bike Share Line Graph Assessment – Page 2

Name: _____

Date: _____

Score: _____ / 10

Recreation Centre Attendance



1. What was the attendance in Week 1?

2. In which week was attendance highest? Give the value.

3. Describe and calculate the change from Week 3 to Week 4.

4. Between which two weeks was the greatest increase? Calculate it.

5. What was the total change from Week 1 to Week 8?

6. Write a conclusion about the trend and support it with two data values.

Interpretation: _____ / 5

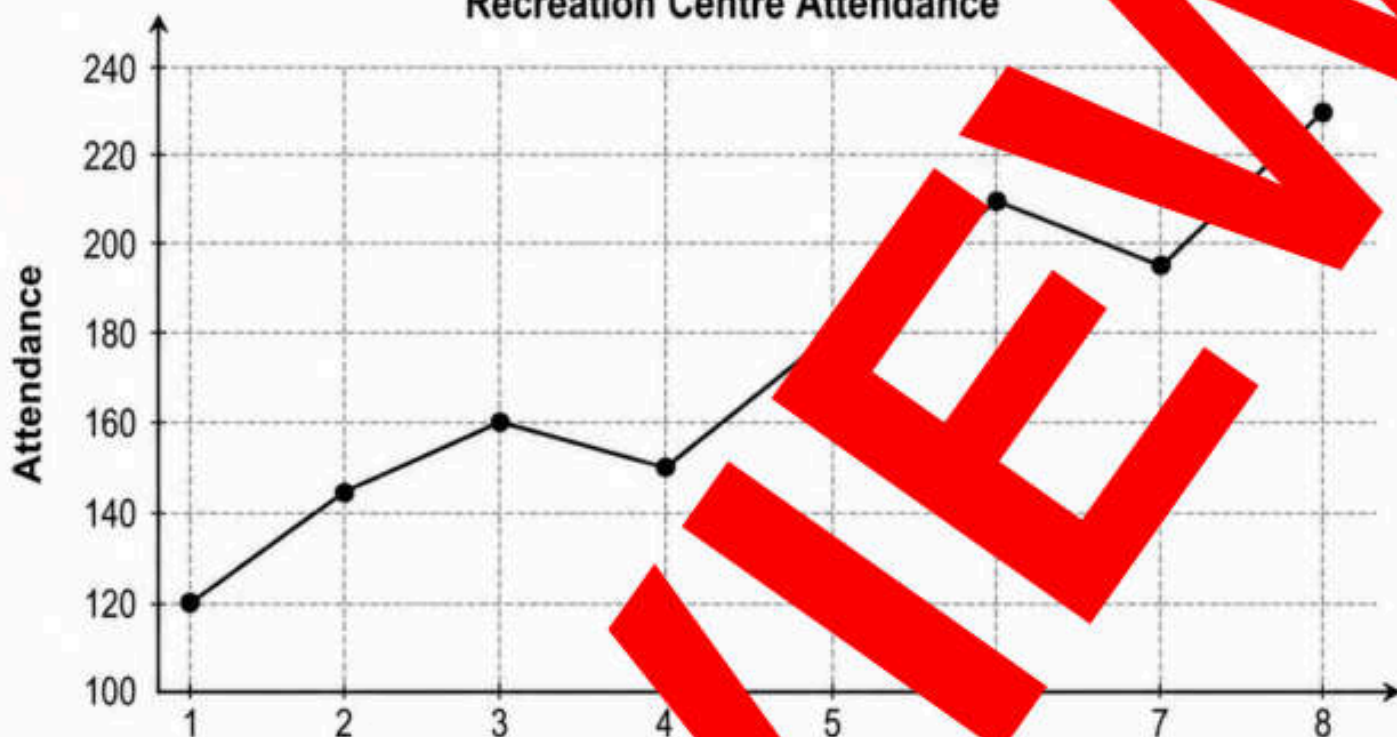
Community Bike Share Line Graph Assessment – Part 2

Name: ANSWERS

Date: _____

Score: _____ / 10

Recreation Centre Attendance



1. What was the attendance in Week 2?

145

2. In which week was attendance highest? Give the value.

Week 8; 230

3. Describe and calculate the change from Week 3 to Week 4.

It decreased from 160 to 150, a decrease of 10.

4. Between which two weeks was the greatest increase? Calculate it.

Week 6 to 8: 210 to 230, an increase of 20.

5. What was the total change from Week 1 to Week 8?

An increase of 110 (230 - 120).

6. Write a conclusion about the trend and support it with two data values.

Attendance generally rose from 120 in Week 1 to 230 in Week 8, despite dips in Weeks 4 and 7.

Interpretation: 5 / 5

Line Graphs Rubric

Student: _____ Teacher: _____ Date: _____

CRITERIA	BEGINNING	DEVELOPING	ACHIEVING	CONFIDENT	EXCEEDING
1. Graph construction	Needs substantial support.	Needs some support.	Accurate graph with required labels.	Effective scale chosen independently.	Precise graph; choices justified.
2. Accurate reading and comparison	Reads few values accurately.	Reads some values; comparison uneven.	Reads and compares accurately.	Calculates changes accurately.	Synthesises complex comparisons.
3. Trends and relationships	Identifies trends with support.	Gives basic trend descriptions.	Describes trends and turning points.	Explains relationships.	Analyses nuanced patterns.
4. Evidence-based conclusions	Gives unsupported statements.	Uses one relevant value.	Supports conclusions with data.	Supports multiple values to justify.	Evaluates conclusions and justifications.
5. Labels, units and communication	Labels or units often missing.	Some labels and units correct.	Clear labels, units and language.	Clear notation and explanations.	Excellent communication.

Overall feedback: _____

Line Graphs



Learning intention

- We are learning to interpret line graphs that show change over time.
- Read exact values and compare intervals.
- Describe trends and turning points.
- Support conclusions with evidence from the graph.



What does a line graph show?

- A line graph connects ordered data points.
- It shows how a numerical measure changes over time.
- The shape helps us see patterns, changes and relationships.



The essential parts

- Title — what the graph is about.
- Horizontal axis — the ordered time values.
- Vertical axis — the numerical measure and unit.
- Scale — equal numerical intervals.
- Data points and line values joined in the order.



Read the scale before the line

- Check the lowest and highest labelled values.
- Find the difference between adjacent labels.
- Count equal gaps, not just printed numbers.
- A point cannot be read accurately until the scale is known.



Worked example: Creek Water Level

Title: Creek Water Level

Horizontal axis: Day

Vertical axis: Water level (cm)

Scale: 40 to 65 in equal intervals of 5



Retrieve values and calculate changes

Day 3: 51 cm

Day 4 to Day 5: 49 cm to 56 cm

Increase: $56 - 49 = 7$ cm

Overall change: $60 - 42 = 18$ cm



Trend language

- Increasing — values move upward.
- Decreasing — values move downward.
- Steady — values stay the same.
- Fluctuating — values go up and fall.



Turning points

- A peak is a local or overall high point.
- A trough is a local or overall low point.
- A turning point is where the direction changes.
- Name when it occurs and describe the change.



Comparing two lines

- Use the same time point and scale.
- Read both values before comparing.
- State which is higher or lower.
- Calculate the difference and cite both values.



Write an evidence statement

CLAIM: State the pattern or relationship.

EVIDENCE: Give exact values and time points.

- LINK: Explain how the evidence supports the claim.

- Example: The temperature rose from 20 on Monday to 50 on Friday.



Fact or inference?

FACT: A value or pattern read directly from the graph.

INFERENCE: A reasonable idea that may explain a pattern.

- An inference must be supported by data.
- A graph can show what has changed, but not always why.



Supported conclusions

- Supported: "Values generally increased from 1 to 50"
- Not supported: "The increase was caused by sunny weather"
- Check whether every claim can be traced to visible data.
- Avoid causes unless graph provides causal evidence.



Missing labels

- Use the context to identify the measure.
- Use the ordered positions to identify time.
- Use the number range to infer a sensible unit.
- Then use a clear unit and axis labels.



Match a story to a graph

- Read the whole shape before matching details.
- Locate the peak, trough and turning point.
- Check the order of rises and falls.
- Explain the match using evidence from the shape.



Construct from a table

- Choose a clear title, axes and units first.
- Select an equal scale that includes every value.
- Place time values in their given order.
- Plan before plotting.

Day	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
		22	27	25	31	36	29



Plot accurately

- Plot one point for each ordered time value.
- Trace across and up to locate each value.
- Check every point against the table.
- Join points only after points are accurate.



Graph-check checklist

- ✓ Clear title
- ✓ Both axes labelled
- ✓ Units shown
- ✓ Equal scale intervals
- ✓ Points plotted accurately
- ✓ Points connected in time order



Guided review

1. What was attendance in Week 4?
2. Between which weeks was the greatest increase?
3. Describe one turning point.
4. Write one support and one conclusion using two values.





Well Done!



Line graphs Quiz



Question 1

What does the horizontal axis of a line graph usually represent?

- A. Ordered time values
- B. The graph title
- C. The largest data value
- D. A conclusion



Answer 1

A. Ordered time values

The horizontal axis commonly shows days, weeks, months, or years in order.



Question 2

The graph shows daily bike trips.
How many trips were recorded on
Friday?



Answer 2

50 trips

Read the Friday point across to the vertical scale.



Question 3

True or false?

A line graph can show how a numerical value changes over a period of time values.



Answer 3

TRUE

The ordered points reveal change and trends over time.



Question 4

During which interval was the greatest increase?

- A. Mon to Tue
- B. Tue to Wed
- C. Thu to Fri
- D. Fri to Sat



Answer 4

C. Thu to Fri

The value rose from 25 L to 31 L: an increase of 6 L.



Question 5

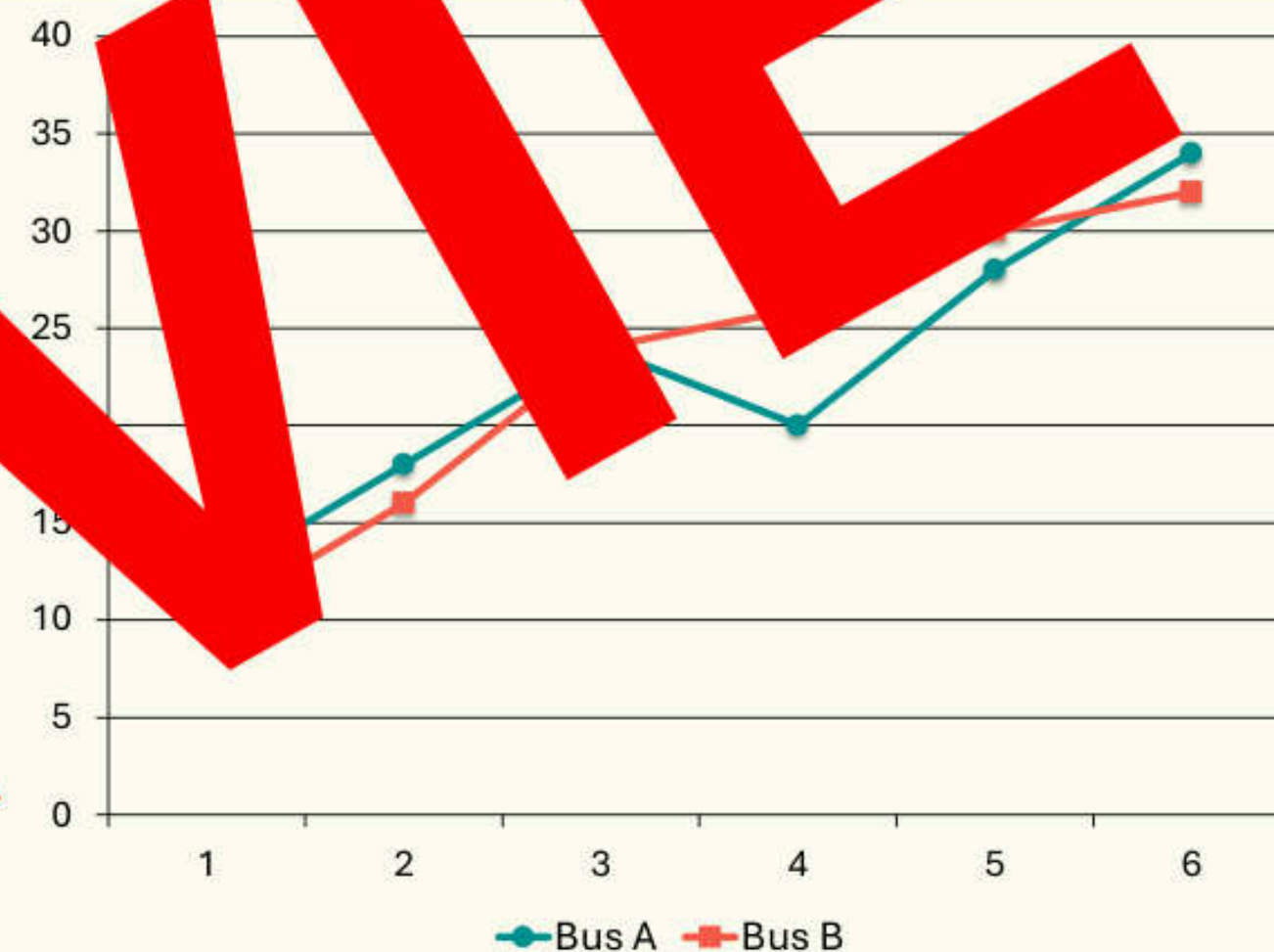
At Stop 4, which bus had more passengers?
State the difference.



Answer 5

Bus B had more passengers.

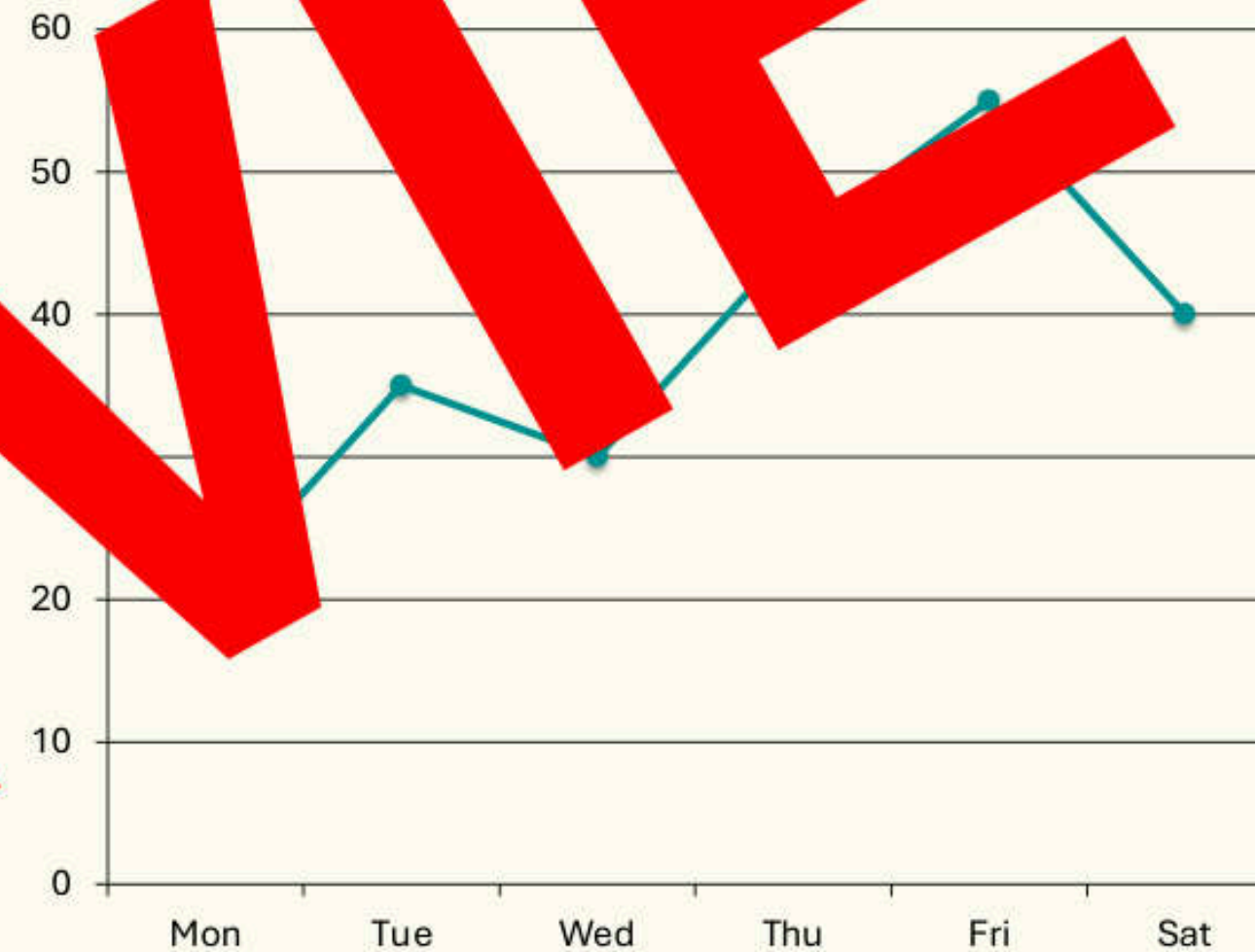
Bus B: 26; Bus A: 20; difference = 6
passengers.



Question 6

Which conclusion is supported by the graph?

- A. Wednesday was rainy.
- B. Loans generally rose from Monday to Friday despite a dip.
- C. Every visitor borrowed the book.
- D. Saturday was busier than Friday.



Answer 6

B. Loans generally rose from Monday to Friday despite a dip. Loans rose from 20 on Monday to 55 on Friday, with a dip on Wednesday.



Question 7

True or false?

Equal numerical intervals may be shown with unequal vertical spacing on the vertical axis.



Answer 7

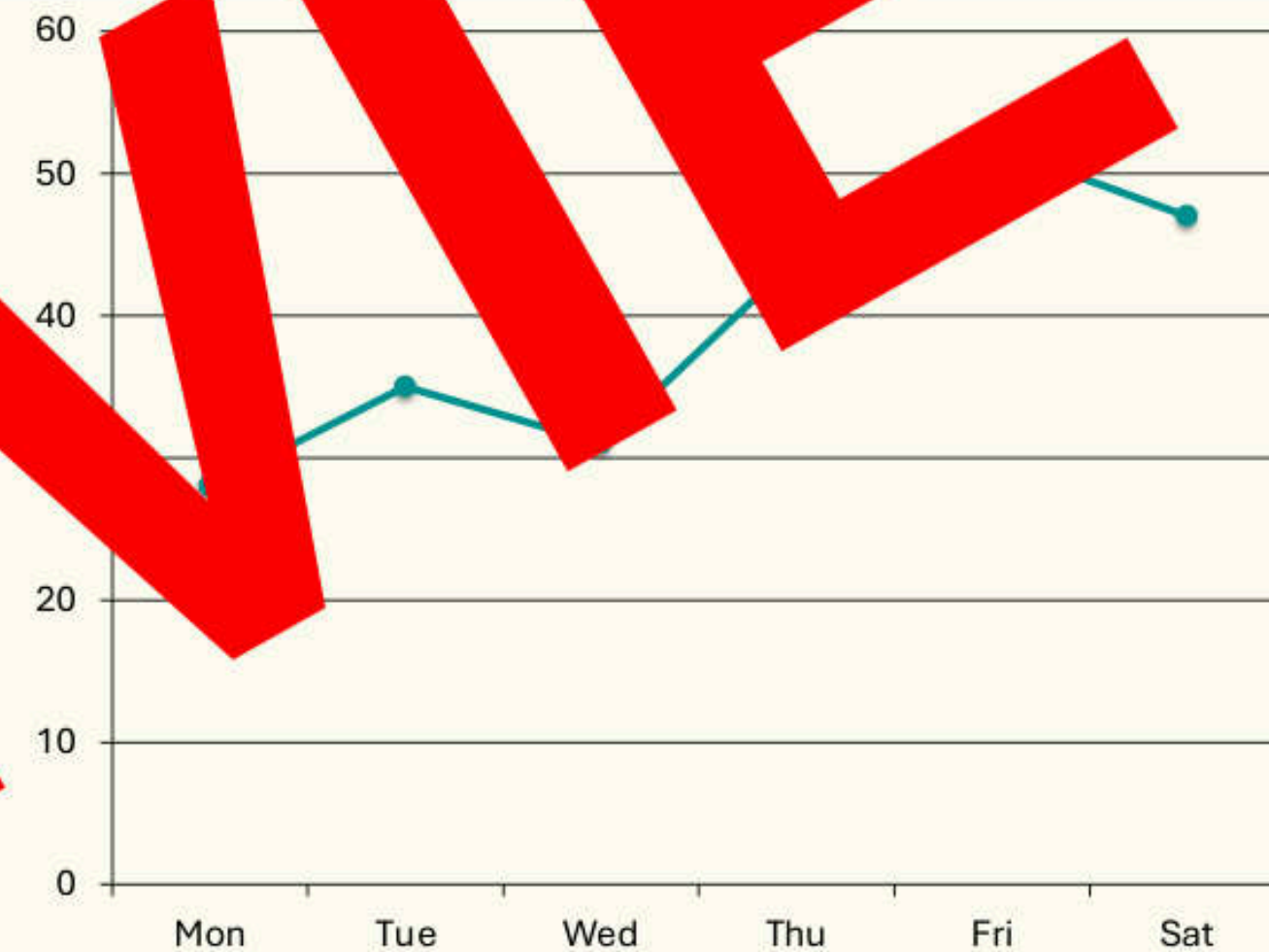
FALSE

Equal numerical intervals must have equal visual spacing on a graph is misleading.



Question 8

Suggest one reasonable inference about smoothie sales.
Support it with two data values.

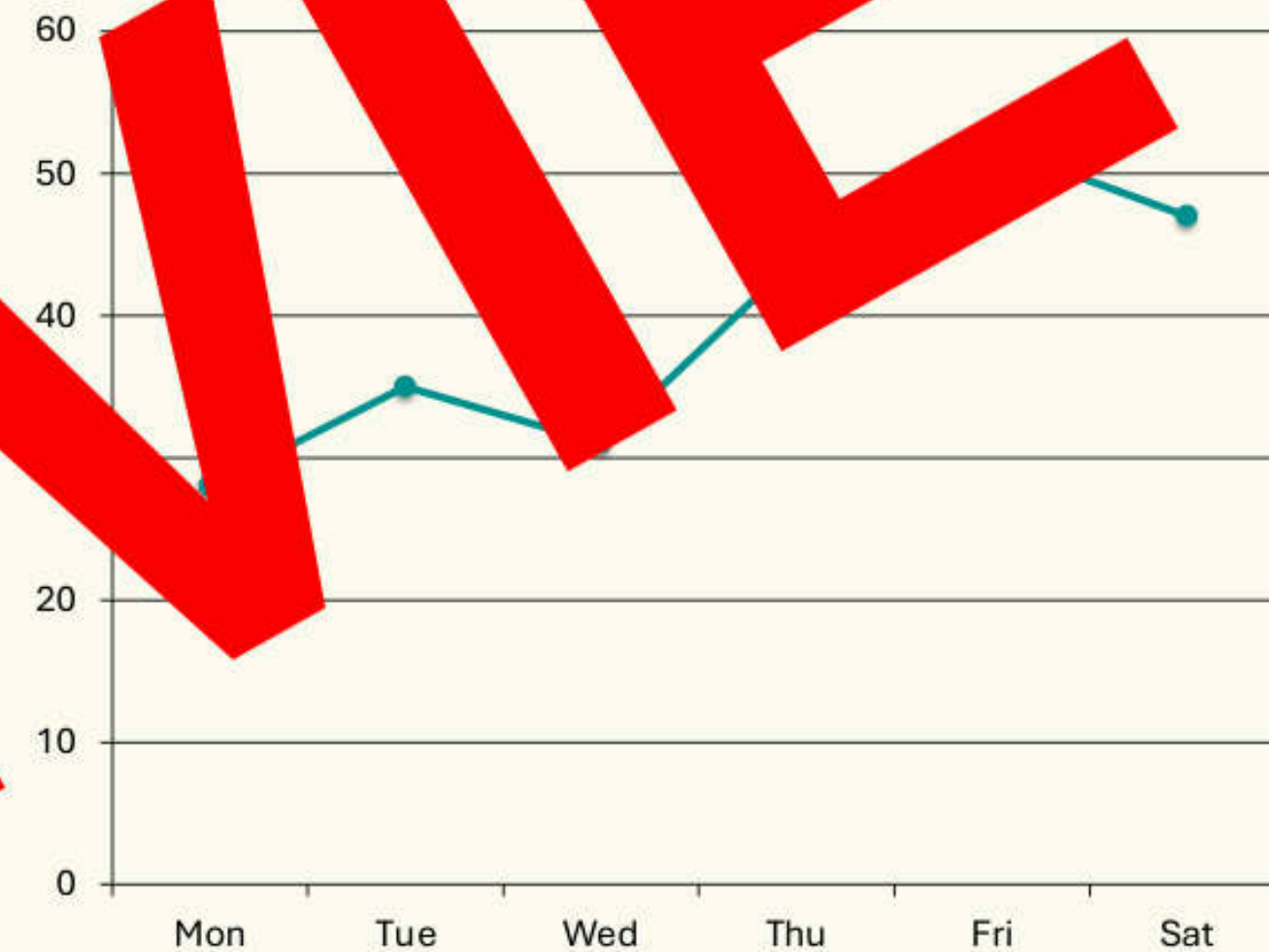


Answer 8

Suggested answer:

Demand may have been stronger near the weekend: 52 were sold on Friday compared with 20 on Monday.

The graph supports the claim, but not the claim that



Question a

A student measured plant height once each week.
Which labels are most useful?

- A. Garden Growth; Week; Height (cm)
- B. Rainfall; Month; Millimetres
- C. Bus Use; Stop; Passengers
- D. Temperature; Hour; Degrees



Answer a

A. Garden Growth; Week; Height (cm)

The context supplies the measure, ordered time unit and numerical unit.



Question 10

Choose a sensible vertical scale for this data table.

Explain why your scale works.

Day	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	48	52	45	68	80	61	



Answer 10

A suitable scale is 0 to 90 in equal intervals of 10.

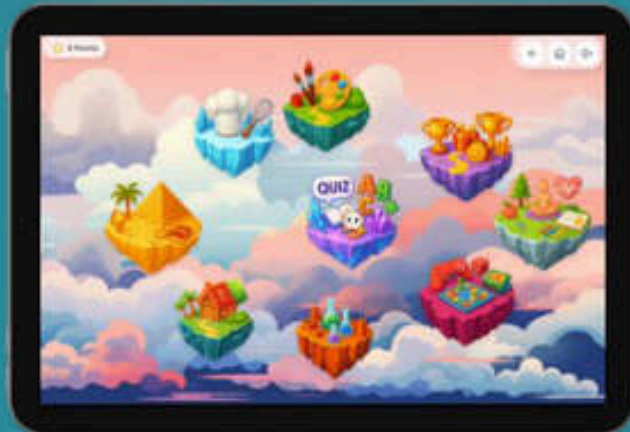
It includes the maximum value, 80, and keeps every interval equal.

Day	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	48	52	45	68	80	61	





Well Done!



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Year 5 Probability

Table of Contents	
Presentation: Year 5 Probability Unit	
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Activity: Likelihood Sort	
Game: Probability Match	
Game: River Race	
Worksheet 1: Chance Check	
Worksheet 2: Fractions of Chance	
Worksheet 3: Probability Line	
Worksheet 4: Card Probability	
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Worksheet 6: Dice Sums and Sample Spaces	
Investigation: Experimental Probability Lab	
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Assessment: Carnival Chance Investigation	
Rubric: Year 5 Probability Unit Rubric	



EQUAL OR NOT?

Describe the outcomes before you decide how likely they are.

1. LIST THE SAME SPACE

Write every possible outcome



Die: {1, 2, 3, 4, 5, 6}

2. CHECK THE OUTCOMES

EQUALLY LIKELY

Each outcome has the same chance.



UNEQUALLY LIKELY

Some outcomes have a greater chance.



3. PREDICT, TRIAL, TALLY



PREDICT



TRIAL



TALLY

Repeat the experiment and record the frequency of each outcome.

4. DECIDE IF IT IS FAIR

A game is fair if each player has an equal chance of winning.



IMPOSSIBLE

UNLIKELY

EVEN CHANCE

LIKELY

CERTAIN

0

$\frac{1}{4}$

$\frac{1}{2}$

$\frac{3}{4}$

1

LIKELIHOOD SORT

Place each scenario in the category where it belongs. Be ready to justify your choice.

IMPOSSIBLE  0	UNLIKELY  between 0 and 1/2	EVEN CHANCE  1/2	LIKELY  between 1/2 and 1	CERTAIN  1

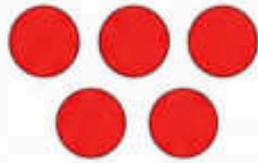
Challenge: Can the same event move to a different zone if the sample space changes?

LIKELIHOOD SORT CARDS

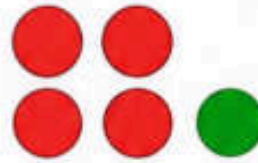
Cut out the cards. Sort each event on the Likelihood Sort mat.



Roll a 7 on a fair six-sided die.



Choose a red counter from 5 red counters.



Choose the green counter from 4 red and 1 green counter.

MATHS

Choose a vowel from the letters MATHS.



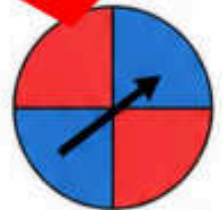
Toss heads on a fair coin.



Roll an even number on a fair die.



Draw an Ace card from a standard deck.



Land on red on a spinner with 2 red and 2 blue equal sectors.



Land on blue on a spinner with 2 blue and 2 yellow equal sectors.



Choose yellow from 4 yellow and 1 black counter.



Roll a number greater than 2 on a fair die.



Draw a card that is not a heart from a standard deck.



Roll a 6 on a fair six-sided die.



Draw a heart from a standard deck.



Land on red on a spinner with 1 red and 3 blue equal sectors.



Choose a month with 32 days.

PROBABILITY MATCH

Build a correct set. Move one space. Reach FINISH first!

HOW TO PLAY

1. Shuffle each card type separately.
2. Draw one EVENT, one FRACTION and one WORD card.
3. If all three match, keep the set and move one space.
4. If they do not match, return the cards. First to FINISH wins.

A match describes the same chance in three ways.



PROBABILITY MATCH CARDS

Cut out the cards. Shuffle the three card types separately.

EVENT



Heads on a fair coin

FRACTION

$$\frac{1}{2}$$

WORD

EVEN CHANCE

EVENT



Roll a 6 on a fair die

FRACTION

$$\frac{1}{6}$$

WORD

ONE CHANCE IN SIX

EVENT



Roll less than 7 on a fair die

FRACTION

$$\frac{6}{6}$$

WORD

CERTAIN

EVENT



Choose blue from 3 blue and 1 yellow

FRACTION

$$\frac{3}{4}$$

WORD

THREE CHANCES IN FOUR

EVENT



Choose green from 4 red and 1 green

FRACTION

$$\frac{1}{5}$$

WORD

ONE CHANCE IN FIVE

EVENT



Roll a 7 on a fair die

FRACTION

$$\frac{0}{6}$$

WORD

IMPOSSIBLE

RIVER RACE

Which two dice total will reach the finish first?

FINISH	FINISH	FINISH	FINISH	FINISH	FINISH
4	5	6	7	8	9
10	11	12	13	14	15
16	17	18	19	20	21
22	23	24	25	26	27
28	29	30	31	32	33
34	35	36	37	38	39
40	41	42	43	44	45
46	47	48	49	50	51
52	53	54	55	56	57
58	59	60	61	62	63
64	65	66	67	68	69
70	71	72	73	74	75
76	77	78	79	80	81
82	83	84	85	86	87
88	89	90	91	92	93
94	95	96	97	98	99
100	101	102	103	104	105
106	107	108	109	110	111
112	113	114	115	116	117
118	119	120	121	122	123
124	125	126	127	128	129
130	131	132	133	134	135
136	137	138	139	140	141
142	143	144	145	146	147
148	149	150	151	152	153
154	155	156	157	158	159
160	161	162	163	164	165
166	167	168	169	170	171
172	173	174	175	176	177
178	179	180	181	182	183
184	185	186	187	188	189
190	191	192	193	194	195
196	197	198	199	200	201
202	203	204	205	206	207
208	209	210	211	212	213
214	215	216	217	218	219
220	221	222	223	224	225
226	227	228	229	230	231
232	233	234	235	236	237
238	239	240	241	242	243
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250	251	252	253	254	255
256	257	258	259	260	261
262	263	264	265	266	267
268	269	270	271	272	273
274	275	276	277	278	279
280	281	282	283	284	285
286	287	288	289	290	291
292	293	294	295	296	297
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322	323	324	325	326	327
328	329	330	331	332	333
334	335	336	337	338	339
340	341	342	343	344	345
346	347	348	349	350	351
352	353	354	355	356	357
358	359	360	361	362	363
364	365	366	367	368	369
370	371	372	373	374	375
376	377	378	379	380	381
382	383	384	385	386	387
388	389	390	391	392	393
394	395	396	397	398	399
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406	407	408	409	410	411
412	413	414	415	416	417
418	419	420	421	422	423
424	425	426	427	428	429
430	431	432	433	434	435
436	437	438	439	440	441
442	443	444	445	446	447
448	449	450	451	452	453
454	455	456	457	458	459
460	461	462	463	464	465
466	467	468	469	470	471
472	473	474	475	476	477
478					

Which two pieces total will reach the finish first?

FINISH	2	3	4	5	6	7	8	9	10	11	12	FINISH
START												START

Roll two fair dice. Add the numbers. Move the token for that total one space.

RIVER RACE

Predict • Play • Explain

Name: _____



1 SET UP

Place one small counter at START in each lane on the River Race board.

2 HOW TO PLAY

1. Take turns rolling two fair dice.
2. Add the numbers.
3. Move the counter in that total's lane one space.
4. Stop when one counter reaches FINISH.

3 PREDICT AND RECORD

I predict total _____ will win because _____

RACE	WINNING TOTAL	NUMBER OF ROLLS	SECOND PLACE
1			
2			
3			

EXPLAIN THE RESULTS

1. Which total won most often?

2. Why are the totals not equally likely?

3. Which total can be made in the most ways?

4. How could you change the game to make it fairer?

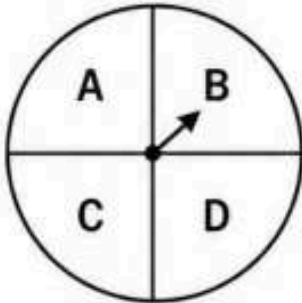
Hint: Think about all 36 ordered pairs.

CHANCE CHECK

Show what you already know about possible outcomes and likelihood.

A. SAMPLE SPACE

1. A fair spinner has four equal sections labelled A, B, C and D. List the sample space.



2. Are the four outcomes equally likely? Explain.

B. LIKELIHOOD WORDS

Write *impossible*, *unlikely*, *even chance*, *likely* or *certain*.

3. Rolling an 8 on a fair six-sided die: _____
4. Choosing red from a bag with 4 red counters: _____
5. Tossing tails on a fair coin: _____
6. Choosing blue from a bag with 3 blue and 1 yellow counter: _____

C. FRACTION OF CHANCE

7. What is the probability of rolling a number greater than 4 on a fair six-sided die?
- _____ / _____ = _____

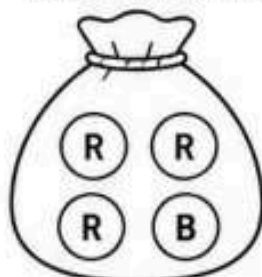
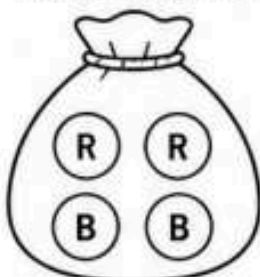
D. DEPENDENT EVENTS

A fair coin lands heads four times in a row. Is tails now more likely on the next toss? Explain.

E. COMPARE

BAG A: 2 red, 2 blue

BAG B: 3 red, 1 blue



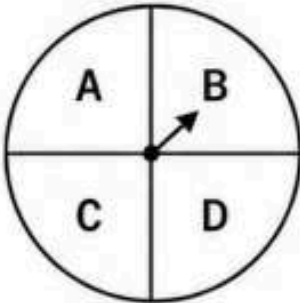
9. Which bag gives the better chance of choosing red? Use a fraction to justify your answer.

CHANCE CHECK

Show what you already know about possible outcomes and likelihood.

A. SAMPLE SPACE

1. A fair spinner has four equal sections labelled A, B, C and D. List the sample space.



{A, B, C, D}

2. Are the four outcomes equally likely? Explain.

Yes. The four equal sectors each have probability

B. LIKELIHOOD WORDS

Write *impossible*, *unlikely*, *even chance*, *likely* or *certain*.

3. Rolling an 8 on a fair six-sided die: **impossible**
 4. Choosing red from a bag with 4 red counters: **certain**
 5. Tossing tails on a fair coin: **even chance**
 6. Choosing blue from a bag with 3 blue and 1 yellow counter: **likely**

C. FRACTION OF CHANCE

7. What is the probability of rolling a number greater than 4 on a fair six-sided die?

$$\frac{2}{6} = \frac{1}{3}$$

The favorable outcomes are 5 and 6.

D. INDEPENDENT EVENTS

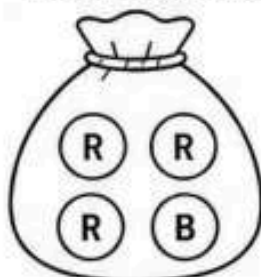
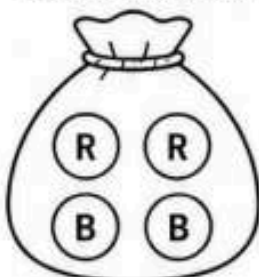
A fair coin lands heads four times in a row. Is tails now more likely on the next toss? Explain.

Each fair coin toss is independent, so tails still has probability 1/2.

E. COMPARE

BAG A: 2 red, 2 blue

BAG B: 3 red, 1 blue



9. Which bag gives the better chance of choosing red? Use a fraction to justify your answer.

Bag B. Its probability is 3/4; Bag A has 2/4 = 1/2.

FRACTIONS OF CHANCE

Part 1 — Sample spaces and equally likely outcomes

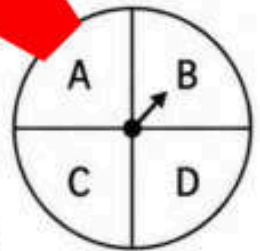
Probability = favourable outcomes / total equally likely outcomes

A. LIST THE SAMPLE SPACE

1. A fair six-sided die is rolled. List all possible outcomes.

2. A fair coin is tossed. List all possible outcomes.

3. A spinner has four equal sections labelled A, B, C and D. List all possible outcomes.



B. WRITE THE PROBABILITY

Write each probability as a fraction. Simplify when you can.

4. Rolling an odd number on a fair six-sided die.

favourable outcomes: _____ probability: _____ / _____ = _____

5. Landing on B or D on the spinner.

favourable outcomes: _____ probability: _____ / _____ = _____

6. Choosing a star from a bag with 3 stars and 2 circles.

favourable outcomes: _____ probability: _____ / _____ = _____



Choosing a vowel from the letters **CHANCE**.

C **H** **A** **N** **C** **E**

favourable outcomes: _____ probability: _____ / _____ = _____

C. CONNECT THE FRACTION TO A WORD

8. Match each fraction to impossible, unlikely, even chance, likely or certain.

0/6

1/6

3/6

5/6

6/6

FRACTIONS OF CHANCE

Part 1 — Sample spaces and equally likely outcomes

Probability = favourable outcomes / total equally likely outcomes

A. LIST THE SAMPLE SPACE

1. A fair six-sided die is rolled. List all possible outcomes.

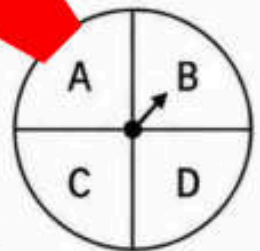
{1, 2, 3, 4, 5, 6}

2. A fair coin is tossed. List all possible outcomes.

{heads, tails}

3. A spinner has four equal sections labelled A, B, C and D. List all possible outcomes.

{A, B, C, D}



B. WRITE THE PROBABILITY

Write each probability as a fraction. Simplify when you can.

4. Rolling an odd number on a fair six-sided die.

favourable outcomes: 1, 3, 5 probability: 3 / 6 = 1 / 2

5. Landing on B or D on the four-section spinner.

favourable outcomes: B, D probability: 2 / 4 = 1 / 2

6. Choosing a star from a bag with 3 stars and 2 circles.

favourable outcomes: 3 stars probability: 3 / 5 = 3 / 5



Choosing a vowel from the letters **CHANCE**.

C H A N C E

favourable outcomes: A, E probability: 2 / 6 = 1 / 3

C. CONNECT THE FRACTION TO A WORD

8. Match each fraction to impossible, unlikely, even chance, likely or certain.

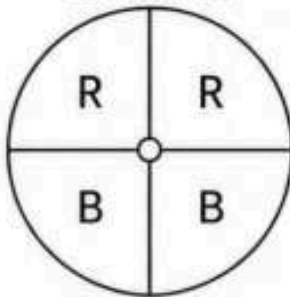
0/6	— impossible
1/6	— unlikely
3/6	— even chance
5/6	— likely
6/6	— certain

FRACTIONS OF CHANCE

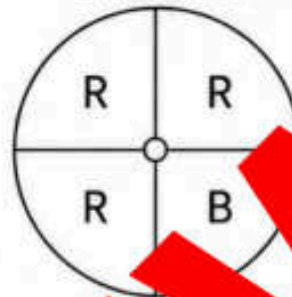
Part 2 — Compare and justify

A. COMPARE THE SPINNERS

SPINNER A



SPINNER B



1. Complete: Spinner A $P(\text{red}) = \frac{\quad}{\quad}$ Spinner B $P(\text{red}) = \frac{\quad}{\quad}$

2. Which spinner gives a better chance of red? Explain.

3. Are the colour outcomes equally likely on each spinner? Explain.

B. FAIR OR UNFAIR?

GAME 1: Roll a fair die.

Player 1 wins on even numbers.

Player 2 wins on odd numbers.

GAME 2: Roll a fair die.

Player 1 wins on 1 or 2.

Player 2 wins on 3, 4, 5 or 6.

4. Decide whether each game is fair or unfair. Use fractions.

5. Change the rule in Game 2 to make it fair.

REASON ABOUT BAG



6. Write $P(\text{star})$, $P(\text{moon})$ and $P(\text{sun})$.
Order them from least to greatest.

7. What should be added to make the three shapes equally likely? Explain.

D. CHALLENGE

8. A spinner has 8 equal sections. Three are striped.
What is $P(\text{not striped})$?

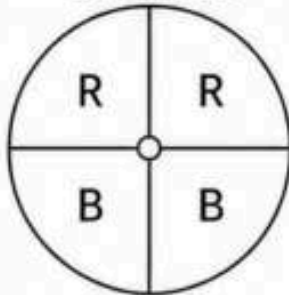
_____ / _____

FRACTIONS OF CHANCE

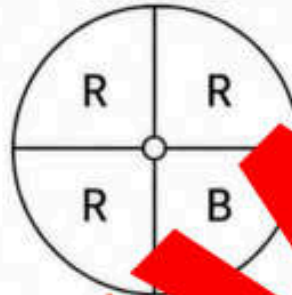
Part 2 — Compare and justify

A. COMPARE THE SPINNERS

SPINNER A



SPINNER B



- Complete: Spinner A $P(\text{red}) = \underline{2 / 4}$ Spinner B $P(\text{red}) = \underline{3 / 4}$
- Which spinner gives a better chance of red? Explain.
Spinner B, because $3/4$ is greater than $2/4$.
- Are the colour outcomes equally likely on each spinner? Explain.
Spinner A: yes, red = blue = $2/4$. Spinner B: no, red = $3/4$ and blue = $1/4$.

B. FAIR OR UNFAIR?

GAME 1: Roll a fair die.
Player 1 wins on 1, 2 or 3.
Player 2 wins on 4, 5 or 6.

GAME 2: Roll a fair die.
Player 1 wins on 1 or 2.
Player 2 wins on 3, 4, 5 or 6.

- Decide whether each game is fair or unfair. Explain using fractions.
Game 1 is fair: Player 1 has $3/6$; Game 2 is unfair: Player 1 has $2/6$; Player 2 has $4/6$.
- Change the rule in Game 2 to make it fair.
Player 1 wins on 1, 2 or 3; Player 2 wins on 4, 5 or 6.

REASON ABOUT BAG



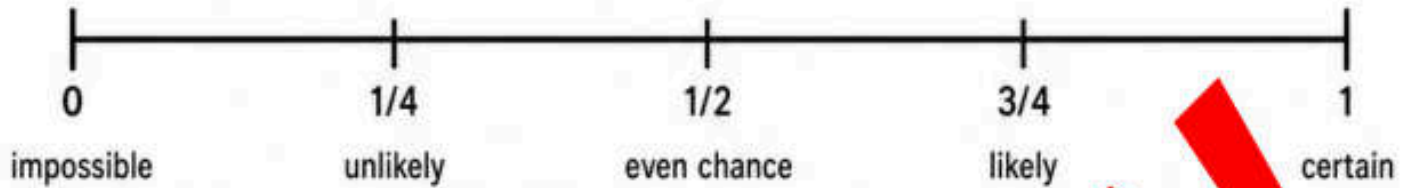
- Write $P(\text{star})$, $P(\text{moon})$ and $P(\text{sun})$.
Order them from least to greatest.
 $P(\text{star}) = 2/6 = 1/3$; $P(\text{moon}) = 3/6 = 1/2$; $P(\text{sun}) = 1/6$.
least to greatest: sun, star, moon.
- What should be added to make the three shapes equally likely? Explain.
Add 1 star and 2 suns. Then each shape has 3 counters.

D. CHALLENGE

- A spinner has 8 equal sections. Three are striped. What is $P(\text{not striped})$?
 $\underline{5 / 8}$
Five of the eight sections are not striped.

PROBABILITY LINE

Place, compare and justify likelihoods from 0 to 1.



A. PLACE THE EVENTS

Write each letter above the best position on the probability line.

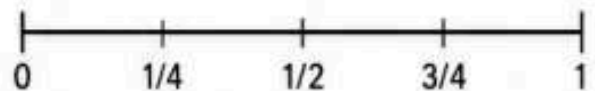
- Roll a 7 on a fair six-sided die.
- Draw a heart from a standard deck.
- Toss heads on a fair coin.
- Roll a 6 on a fair six-sided die.
- Roll a number greater than 2 on a fair six-sided die.
- Choose white from a bag containing 4 white counters.



B. CALCULATE AND LOCATE

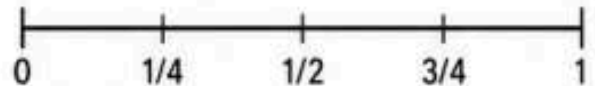
7. A spinner has 8 equal sections, 3 of which show a triangle. Write $P(\text{triangle})$ and mark it on the mini line.

$P(\text{triangle})$ _____



8. A bag has 5 stars and 3 circles. Write $P(\text{star})$ and mark it on the mini line.

$P(\text{star})$ _____



C. REASON

9. An event has probability $\frac{3}{4}$. What is the probability that it does not happen? Explain.

10. Create an event that is likely but not certain. State its sample space and probability.

PROBABILITY LINE

Place, compare and justify likelihoods from 0 to 1.



A. PLACE THE EVENTS

Write each letter above the best position on the probability line.

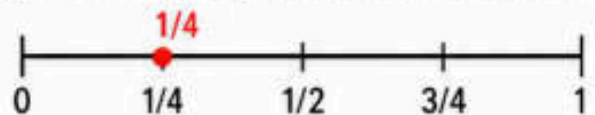
- Roll a 7 on a fair six-sided die.
- Draw a heart from a standard deck.
- Toss heads on a fair coin.
- Roll a 6 on a fair six-sided die.
- Roll a number greater than 2 on a fair six-sided die.
- Choose white from a bag containing 4 white counters.



B. CALCULATE AND LOCATE

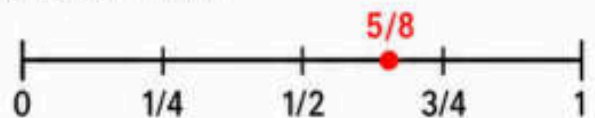
- A spinner has 8 equal sections. 2 sections show a triangle. Write $P(\text{triangle})$ and mark it on the mini line.

$P(\text{triangle}) = \frac{2}{8} = \frac{1}{4}$



- A bag has 5 stars and 3 circles. Write $P(\text{star})$ and mark it on the mini line.

$P(\text{star}) = \frac{5}{8}$



C. REASON

- An event has probability $\frac{3}{4}$. What is the probability that it does not happen? Explain.

$\frac{1}{4}$. An event and its complement add to 1.

- Create an event that is likely but not certain. State its sample space and probability.

Example: roll a number greater than 2 on a fair die.

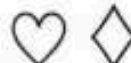
Sample space {1, 2, 3, 4, 5, 6}; favourable outcomes {3, 4, 5, 6}; probability $\frac{4}{6} = \frac{2}{3}$.

CARD PROBABILITY

Use the standard 52-card deck as the sample space.

52 cards • 4 suits • 13 cards in each suit

26 red cards: hearts and diamonds



26 black cards: clubs and spades



4 cards of each rank: A, 2–10, J, Q, K

A. WRITE AND SIMPLIFY

Write each probability as a fraction of 52. Simplify when possible.

1. Draw a red card. _____ / 52 = _____
2. Draw a club. _____ / 52 = _____
3. Draw a king. _____ / 52 = _____
4. Draw a red ace. _____ / 52 = _____
5. Draw the queen of hearts. _____ / 52 = _____
6. Draw a card that is not a heart. _____ / 52 = _____

B. COMPARE

7. Which is more likely: drawing a king or drawing a club? Use fractions to explain.

8. Order the events from least to greatest probability: draw the ace of spades; draw a picture card (J, Q, or K); draw a red card.
 least _____ middle _____ greatest _____

REASON

9. A card is drawn, replaced and the deck is shuffled. A second card is drawn. Does the first card change the probability of the second draw? Explain.

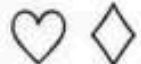
10. Create an event with probability $\frac{1}{4}$. Name the event and justify it.

CARD PROBABILITY

Use the standard 52-card deck as the sample space.

52 cards • 4 suits • 13 cards in each suit

26 red cards: hearts and diamonds



26 black cards: clubs and spades



4 cards of each rank: A, 2–10, J, Q, K

A. WRITE AND SIMPLIFY

Write each probability as a fraction of 52. Simplify when possible.

1. Draw a red card.
2. Draw a club.
3. Draw a king.
4. Draw a red ace.
5. Draw the queen of hearts.
6. Draw a card that is not a heart.

$$26 / 52 = \frac{1}{2}$$

$$13 / 52 = \frac{1}{4}$$

$$4 / 52 = \frac{1}{13}$$

$$2 / 52 = \frac{1}{26}$$

$$1 / 52$$

$$39 / 52 = \frac{3}{4}$$

B. COMPARE

7. Which is more likely: drawing a king or drawing a club? Use fractions to explain.

A club is more likely. $13 / 52 = 1/4$, while a king is $4 / 52 = 1/13$.

8. Order the events from least to greatest probability: draw the ace of spades; draw a picture card (J, Q or K); draw a red card.

least **ace of spades**

middle **picture card**

greatest **red card**

C. REASON

9. A card is drawn, replaced and the deck is shuffled. A second card is drawn.

Does the first card change the probability of the second draw? Explain.

No. Replacement restores the same 52-card sample space, so the second draw is independent.

10. Create an event with probability $\frac{1}{4}$. Name the event and justify it.

Example: draw a club. There are 13 clubs, so $13 / 52 = 1/4$.

SPINNER DESIGNER

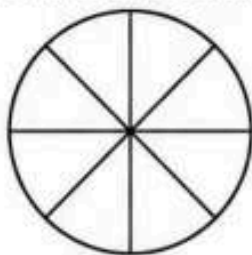
Name: _____ Date: _____

Build spinners that match each probability rule.

A. MATCH THE RULE

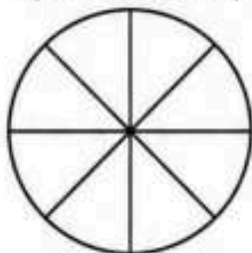
Label every equal section. Then write each probability.

1. This spinner has 8 equal sections. Make $P(\text{triangle}) = 1/4$.
Label all other sections circle.



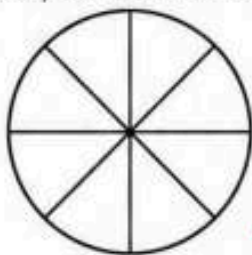
$P(\text{triangle}) = \frac{\quad}{\quad} / \frac{\quad}{\quad}$ $P(\text{circle}) = \frac{\quad}{\quad} / \frac{\quad}{\quad}$

2. This spinner has 8 equal sections. Make blue three times as likely as yellow.



$P(\text{blue}) = \frac{\quad}{\quad} / \frac{\quad}{\quad}$ $P(\text{yellow}) = \frac{\quad}{\quad} / \frac{\quad}{\quad}$

3. This spinner has 8 equal sections. Make $P(\text{star}) = 1/8$ and $P(\text{circle}) = \frac{\quad}{\quad}$.
Use square for the remaining section.



$P(\text{circle}) = \frac{\quad}{\quad} / \frac{\quad}{\quad}$

B. DESIGN A GAME

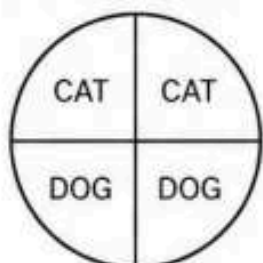
4. Players spin an 8-section spinner. Player 1 wins on A. Player 2 wins on B.
Design a fair spinner and justify it with calculations.



Redesign the game so it is unfair but both players can still win.
Write the probabilities.



C. CHECK A CLAIM



6. Sam says CAT is more likely because the pointer is closer to a CAT section.
Is Sam correct? Explain.

SPINNER DESIGNER

Name: ANSWERS Date: _____

Build spinners that match each probability rule.

A. MATCH THE RULE

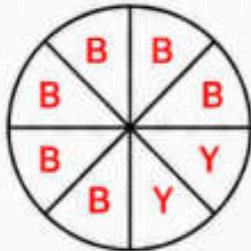
Label every equal section. Then write each probability.

1. This spinner has 8 equal sections. Make $P(\text{triangle}) = 1/4$.
Label all other sections circle.



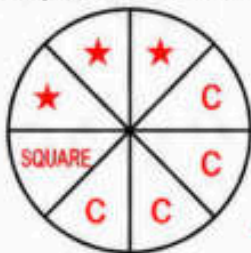
$$P(\text{triangle}) = \frac{2}{8} \quad P(\text{circle}) = \frac{6}{8}$$

2. This spinner has 8 equal sections. Make blue three times as likely as yellow.



$$P(\text{blue}) = \frac{6}{8} \quad P(\text{yellow}) = \frac{2}{8}$$

3. This spinner has 8 equal sections. Make $P(\text{star}) = 1/8$ and $P(\text{circle}) = 1/8$.
Use square for the remaining section.



$$P(\text{square}) = \frac{1}{8} \quad P(\text{circle}) = \frac{1}{8}$$

B. DESIGN A GAME

4. Players spin a spinner. Player 1 wins on A. Player 2 wins on B.
Design a fair spinner and justify it with calculations.



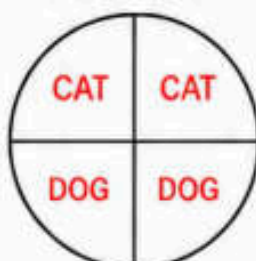
$$P(A) = 4/8 = 1/2; P(B) = 4/8 = 1/2, \text{ so the game is fair.}$$

Redesign the game so it is unfair but both players can still win.
Write the probabilities.



$$\text{One valid design: } P(A) = 6/8 = 3/4; P(B) = 2/8 = 1/4.$$

C. CHECK A CLAIM



6. Sam says CAT is more likely because the pointer is closer to a CAT section.
Is Sam correct? Explain.

No. $CAT = 2/4 = 1/2$ and $DOG = 2/4 = 1/2$. The pointer's starting position does not change the equal sectors.

DICE SUMS AND SAMPLE SPACES

Part 1 — Build the 36-outcome table

Roll two fair six-sided dice. Each cell represents one ordered pair. Add the row number and column number, then write the total in the cell.

		DIE 2					
DIE 1	DIE 1 + DIE 2	1	2	3	4	5	6
	1						
	2						
	3						
	4						
	5						
	6						

A. NOTICE THE STRUCTURE

- How many ordered pairs are in the complete sample space? _____
- List every ordered pair that gives a total of 4.

- List every ordered pair that gives a total of 7.

Which two totals can each be made in only one way? _____ and _____

B. REASON

- Are the totals 2 to 12 equally likely? Use the table to explain.

- Predict the most likely total. Explain your reasoning.

DICE SUMS AND SAMPLE SPACES

Part 1 — Build the 36-outcome table

Roll two fair six-sided dice. Each cell represents one ordered pair. Add the row number and column number, then write the total in the cell.

		DIE 2					
DIE 1	DIE 1 + DIE 2	1	2	3	4	5	6
	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

A. NOTICE THE STRUCTURE

1. How many ordered pairs are in the complete sample space? 36

2. List every ordered pair that gives a total of 4.

(1, 3), (2, 2), (3, 1)

3. List every ordered pair that gives a total of 7.

(2, 5), (3, 4), (4, 3), (5, 2), (6, 1)

Which two totals can each be made in only one way? 2 and 12

B. REASON

5. Are the totals 2 to 12 equally likely? Use the table to explain.

No. The number of ordered pairs varies. Total 7 has 6 ways, while totals 2 and 12 have 1 way each.

6. Predict the most likely total. Explain your reasoning.

Total 7. It can be made in 6 of the 36 ordered pairs.

DICE SUMS AND SAMPLE SPACES

Part 2 — Compare theoretical and observed results

A. COUNT THE WAYS

Use your 36-outcome table from Part 1.

TOTAL	2	3	4	5	6	7	8	9	10	11	12
WAYS											
FRACTION	___ / 36	___ / 36	___ / 36	___ / 36	___ / 36	___ / 36	___ / 36	___ / 36	___ / 36	___ / 36	___ / 36

B. CALCULATE

- $P(\text{total of 7}) = \frac{\quad}{36} = \frac{\quad}{\quad}$
- $P(\text{total of 6 or 8}) = \frac{\quad}{36} = \frac{\quad}{\quad}$
- $P(\text{total of at least 10}) = \frac{\quad}{36} = \frac{\quad}{\quad}$
- $P(\text{even total}) = \frac{\quad}{36} = \frac{\quad}{\quad}$
- Which is more likely: a total of 5 or a total of 10? Explain.

C. IS THE GAME FAIR?

Player A wins on totals 2–7. Player B wins on totals 8–12. Roll again on 7.

- Is the game fair? Count the ordered pairs for each player.

Player A: _____ Player B: _____ / 36

- If Player A rolls on 7, is the game still fair? Explain.

D. SAMPLE WITH AN EXPERIMENT

60 rolls: 2:2 3:3 4:5 5:7 6:8 7:10 8:8 9:7 10:5 11:3 12:2

- Which occurred most often? _____
- How closely do these results match the theoretical pattern? Give two pieces of evidence.

- Would another 60 rolls have exactly the same frequencies? Explain.

DICE SUMS AND SAMPLE SPACES

Part 2 — Compare theoretical and observed results

A. COUNT THE WAYS

Use your 36-outcome table from Part 1.

TOTAL	2	3	4	5	6	7	8	9	10	11	12
WAYS	1	2	3	4	5	6	5	4	3	2	1
FRACTION	1/36	2/36	3/36	4/36	5/36	6/36	5/36	4/36	3/36	2/36	1/36

B. CALCULATE

1. $P(\text{total of } 7) = \frac{6}{36} = \frac{1}{6}$
2. $P(\text{total of } 6 \text{ or } 8) = \frac{10}{36} = \frac{5}{18}$
3. $P(\text{total of at least } 10) = \frac{6}{36} = \frac{1}{6}$
4. $P(\text{even total}) = \frac{18}{36} = \frac{1}{2}$
5. Which is more likely: a total of 5 or a total of 10? Explain.
A total of 5 is more likely: 4/36 compared with 3/36 for a total of 10.

C. IS THE GAME FAIR?

Player A wins on totals 2–7. Player B wins on totals 8–12. Roll again on 7.

6. Is the game fair? Count the possible ordered pairs for each player.

Player A: 18 Player B: 15/36

Yes. Each player has 18 winning ordered pairs; a 7 is rolled again.

7. If Player A also wins on 7, is the game still fair? Explain.

No. If Player A wins on 7, Player A would have 21/36 and Player B would have 15/36.

D. MATCH WITH AN EXPERIMENT

60 rolls: 2:2 3:3 4:5 5:7 6:8 7:10 8:8 9:7 10:5 11:3 12:2

8. Which total occurred most often? 7
9. How closely do these results match the theoretical pattern? Give two pieces of evidence.
The pattern is close: 7 occurred most often, and symmetric totals such as 6 and 8 had equal frequencies.
10. Would another 60 rolls have exactly the same frequencies? Explain.
No. Random variation means another 60 rolls may have different frequencies, even though the overall pattern should be similar.

EXPERIMENTAL PROBABILITY LAB

Part 1 — Plan and collect 40 trials

A. CHOOSE ONE EXPERIMENT

A. Toss a fair coin.
Target event: heads.

B. Roll a fair six-sided die.
Target event: a number
greater than 4.

C. Spin four equal sections
labelled S, S and N.
Target event: S.

Circle A, B or C. Use the same equipment and method for every trial.

B. PLAN

1. Sample space: _____
2. Are the outcomes equally likely? Explain. _____
3. Theoretical probability of the target event: _____
4. Predicted target frequency in 40 trials: _____

C. RECORD EVERY TRIAL

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21			24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40

D. ANALYSE

OUTCOME	TALLY	FREQUENCY

Check: total frequency = _____

EXPERIMENTAL PROBABILITY LAB

Part 2 — Analyse, compare and explain

Name: _____ Date: _____

A. YOUR RESULTS

1. Chosen experiment: A / B / C
2. Target event: _____
3. Observed target frequency: _____ out of 40
4. Experimental probability of the target event: _____ / 40 = _____
5. How did the observed frequency compare with your prediction?

6. Which outcome occurred most often? Which occurred least often?

B. COMPARE GROUP DATA

Record two other groups' results for the same experiment.

GROUP	TRIALS	TARGET FREQUENCY	EXPERIMENTAL PROBABILITY
Mine			
Group 2			
Group 3			

7. Which result is closest to the theoretical probability? Explain.

8. Combine the three target frequencies. What is the combined experimental probability?
total target frequency: _____ / total trials: _____ = _____

C. USE THE EVIDENCE

9. Does a short experiment have to match the theoretical probability exactly? Explain.

10. If the experiment continued for 400 trials, what pattern would you expect? Why?

11. Were your original outcomes equally likely or unequally likely? Use the sample space and frequencies as evidence.

D. IMPROVE THE METHOD

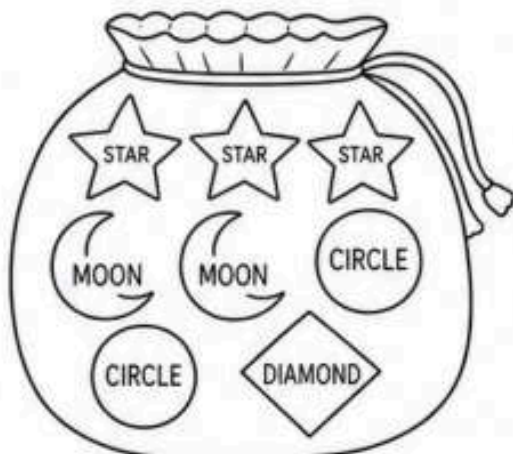
12. Name one change that would make the experiment more reliable or fair.

My evidence shows that _____

CARNIVAL CHANCE INVESTIGATION**Assessment — Part 1: Sample spaces and predictions**

The carnival booth offers two prize games. The equipment is reset after every turn.

GAME A — Draw one token. Win a prize on STAR.



GAME B — Spin once. Win a prize on GOLD.



1. List the possible outcome labels for Game A. [2 marks]

2. Are the four Game A outcome labels equally likely? Explain using the token counts. [2 marks]

3. Write $P(\text{STAR})$ for Game A. [1 mark] _____ / _____

4. Write $P(\text{STAR})$ for Game A. [1 mark] _____ / _____

5. List possible outcome labels for Game B. [1 mark]

6. Write $P(\text{GOLD})$ and $P(\text{not GOLD})$ for Game B. [2 marks]

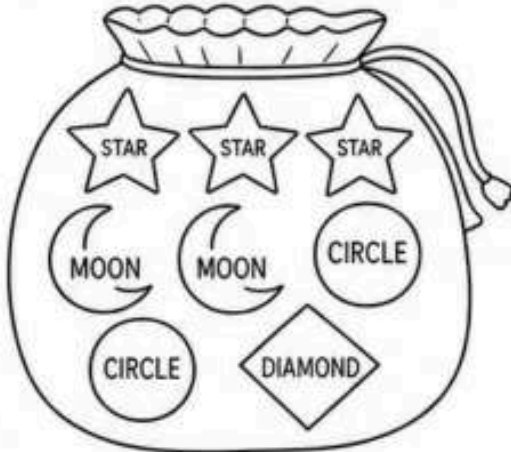
$P(\text{GOLD}) =$ _____ / _____ $P(\text{not GOLD}) =$ _____ / _____

7. Before any trials are run, which game gives a better chance of winning a prize? Compare the fractions. [3 marks]

CARNIVAL CHANCE INVESTIGATION**Assessment — Part 1: Sample spaces and predictions**

The carnival booth offers two prize games. The equipment is reset after every turn.

GAME A — Draw one token. Win a prize on STAR.



GAME B — Spin once. Win a prize on GOLD.



1. List the possible outcome labels for Game A. [2 marks]

STAR, MOON, CIRCLE, DIAMOND

2. Are the four Game A outcome labels equally likely? Explain using the token counts. [2 marks]

No. The labels have different token counts. STAR 3, MOON 2, CIRCLE 2, DIAMOND 1.

3. Write $P(\text{STAR})$ for Game A. [1 mark] **$3 / 8$**

4. Write $P(\text{not STAR})$ for Game A. [1 mark] **$5 / 8$**

5. List the possible outcome labels for Game B. [1 mark]

GOLD, WHITE

6. Write $P(\text{GOLD})$ and $P(\text{not GOLD})$ for Game B. [2 marks]

$P(\text{GOLD}) = \mathbf{1 / 4}$ $P(\text{not GOLD}) = \mathbf{3 / 4}$

7. Before any trials are run, which game gives a better chance of winning a prize? Compare the fractions. [3 marks]

Game A. $P(\text{win}) = 3/8$. Game B has $1/4 = 2/8$. Since $3/8 > 2/8$, Game A gives the better chance.

CARNIVAL CHANCE INVESTIGATION

Assessment — Part 2: Evidence and fair decisions

Game A theoretical prize probability = $\frac{3}{8}$ Game B theoretical prize probability = $\frac{1}{4}$

EXPERIMENTAL RESULTS

GAME	PRIZE	NO PRIZE	TOTAL TRIALS
Game A	16	24	40
Game B	8	32	40

8. Write the experimental prize probability for each game. [2 marks]

Game A: _____ / 40 = _____

Game B: _____ / 40 = _____

9. Compare each experimental probability with its theoretical probability. [4 marks]

10. Which game's experimental result was closer to its theoretical probability? Show the difference using fractions out of 40. [2 marks]

11. Which game would you recommend to a player who wants the better chance of a prize? Use both theoretical and experimental evidence. [3 marks]

12. Use the 8 prizes in Game A to make a fair two-player game. Player 1 and Player 2 must each have four winning outcomes. State both winning rules. [3 marks]

13. The carnival owner wants a lower prize rate, but prizes must still be possible. Which carnival game should the owner choose? Justify your decision. [2 marks]

14. Predict how many prizes Game B might give in 80 trials. Explain why this is an estimate, not a guarantee. [2 marks]

Part 2 total: _____ / 18

Assessment total: _____

CARNIVAL CHANCE INVESTIGATION

Assessment — Part 2: Evidence and fair decisions

Game A theoretical prize probability = $\frac{3}{8}$ Game B theoretical prize probability = $\frac{1}{4}$

EXPERIMENTAL RESULTS

GAME	PRIZE	NO PRIZE	TOTAL TRIALS
Game A	16	24	40
Game B	8	32	40

8. Write the experimental prize probability for each game. [2 marks]

Game A: $\frac{16}{40} = \frac{2}{5}$ Game B: $\frac{8}{40} = \frac{1}{5}$

9. Compare each experimental probability with its theoretical probability. [4 marks]

Game A: $\frac{3}{8} = \frac{15}{40}$ theoretically; $\frac{16}{40}$ was observed, which is $\frac{1}{40}$ higher.Game B: $\frac{1}{4} = \frac{10}{40}$ theoretically; $\frac{8}{40}$ was observed, which is $\frac{2}{40}$ lower.

10. Which game's experimental result was closer to its theoretical probability? Show the difference using fractions out of 40. [2 marks]

Game A was closer. Its difference was $\frac{1}{40}$; Game B's difference was $\frac{2}{40}$.

11. Which game would you recommend to a player who wants the better chance of a prize? Use both theoretical and experimental evidence. [3 marks]

Recommend Game A. Theoretical: $\frac{3}{8} > \frac{1}{4}$. Experimental: $\frac{16}{40} > \frac{8}{40}$.

12. Use the data from Game A to make a fair two-player game. Player 1 and Player 2 must each have four winning outcomes. State your winning rules. [3 marks]

Player 1 wins on STAR or DIAMOND: $3 + 1 = 4$ tokens.Player 2 wins on HEART or CIRCLE: $2 + 2 = 4$ tokens. Each has $\frac{4}{8} = \frac{1}{2}$.

13. If the game owner wants a lower prize rate, but prizes must still be possible. Which original game should the owner choose? Justify your decision. [2 marks]

Choose Game B. Its theoretical prize rate is $\frac{1}{4}$, lower than $\frac{3}{8}$, and its observed rate $\frac{8}{40}$ was lower than Game A's $\frac{16}{40}$.

14. Predict how many prizes Game B might give in 80 trials. Explain why this is an estimate, not a guarantee. [2 marks]

About 20 prizes, because $\frac{1}{4}$ of 80 is 20. Random variation means the actual frequency may differ.

LEVEL 5 PROBABILITY UNIT RUBRIC

AC9M5P01 • AC9M5P02

Student: _____

Date: _____

Overall: _____

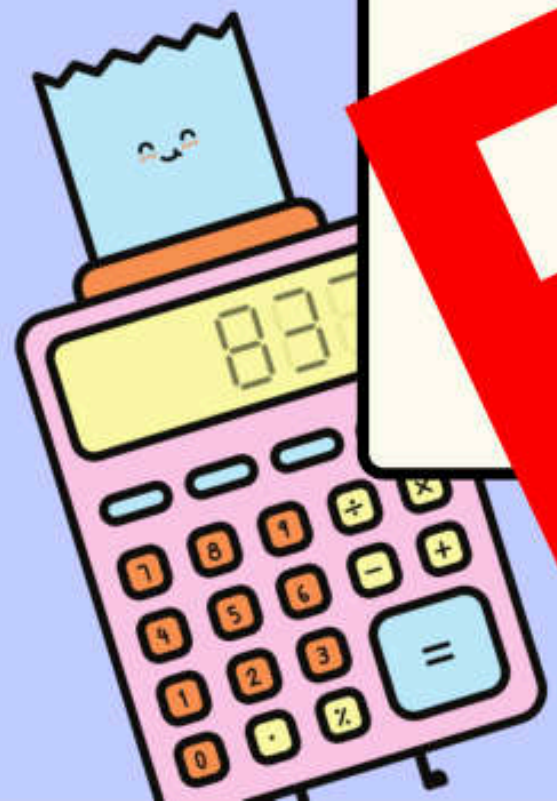
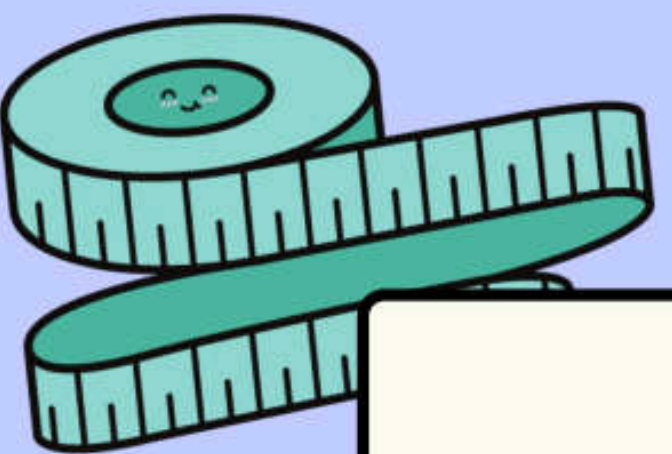
CRITERION	BEGINNING	DEVELOPING	ACHIEVING	CONFIDENT	EXCEEDING
POSSIBLE OUTCOMES	Lists few outcomes; sample space is incomplete.	Lists most outcomes; sample space is complete.	Lists complete sample spaces for familiar experiments.	Systematically lists sample spaces, including ordered pairs.	Generalises efficient methods and checks completeness.
EQUAL OR UNEQUAL	Uses chance words inconsistently.	Identifies some equally likely outcomes.	Clearly distinguishes equal and unequal outcomes.	Justifies comparisons with counts and fractions.	Evaluates fairness and proposes valid changes.
PROBABILITY FRACTIONS	Needs support to form probability fractions.	Forms simple fractions with some errors.	Uses and compares correct probability fractions.	Simplifies and connects fractions to the 0–1 scale.	Uses complements and equivalent fractions flexibly.
REPEATED TRIALS	Records incomplete or inaccurate trials.	Runs trials with support and a partial tally.	Conducts repeated trials and records frequencies.	Uses consistent methods and accurate tallies.	Improves reliability and explains method choices.
EVIDENCE AND REASONING	Makes claims without evidence.	Describes results with limited comparison.	Compares observed frequency with predicted likelihood.	Explains variations and uses evidence fairly.	Synthesises theory and data, then critiques conclusions.

Teacher feedback: _____

Next step: _____

Year 5 Probability

PREVIEW



Learning Goals

PREVIEW

are learning to

In complete sample spaces

can appear equally and unequal chances

run trials and use frequency as evidence



Chance Language

Impossible — cannot happen

Unlikely — happens less often than not

Even chance — equally likely to happen or not

Likely — happens more often than not

Certain — must happen



Build a Sample Space

1. Name the chance experiment.
 2. List every possible outcome.
 3. Check that none are missing or repeated.
- That complete list is the sample space.



Equally Likely

Outcomes are equally likely when each has the same chance.

A fair coin: {heads, tails}

A fair die: {1, 2, 3, 4, 5, 6}

Equal sections on a fair spinner have equal chances.



Unequally Likely

Outcomes are unequally likely when chances differ.

A bag with 6 blue and 2 yellow counters favours blue.

List all outcomes, then count those supporting each event.

More favourable outcomes means a greater theoretical chance.



Probability as a Fraction

Probability = favourable outcomes $\div$ total possible outcomes

Example: $p(\text{even}) = 3/6 = 1/2$

Example: 4 red, 6 blue: $p(\text{red}) = 4/10 = 2/5$

Use fractions between 0 and 1.



The Probability Line

0 means impossible, 1 means certain.

$\frac{1}{2}$ marks an even chance.

Values nearer 0 are less likely.

Values nearer 1 are more likely.

Place events using evidence, not guesswork.



Cards and Chance

A standard deck has 52 cards: 4 suits $\times$ 13.

There are 26 red and 26 black cards.

$$p(\text{heart}) = 13/52 = 1/4$$

$$p(\text{face card}) = 12/52 = 3/13$$

check whether events overlap before adding counts.



Two Dice: Outcomes

Two dice create $6 \times 6 = 36$ ordered outcomes.

Totals are not equally likely.

A total of 7 has 6 combinations; a total of 2 has 1.

Use a row-by-column sample-space table to count each total.



Repeated Experiments

Choose a chance experiment and prediction.

Run many trials using the same method.

Record each result with a tally.

Frequency = number of times an outcome occurs.

More trials usually reveal a steadier pattern.



Expected and Observed

Theoretical probability predicts what should happen.

Experimental probability sees what did happen.

Experimental probability = $\text{frequency} \div \text{number of trials}$

Small sample results can differ and still be reasonable.



Independent Trials

Each fair coin toss, die roll or spinner turn starts afresh.

Previous results do not change the next trial.

Five tails in a row does not make heads 'due'.

This is independence.



Is the Game Fair?

A fair game gives all players equal chances under the rules.

List the winning outcomes for every player.

Compare the theoretical chances before playing.

Then test with repeated trials and review the frequencies.



Investigation Challenge

Design two experiments: one equal, one unequal.

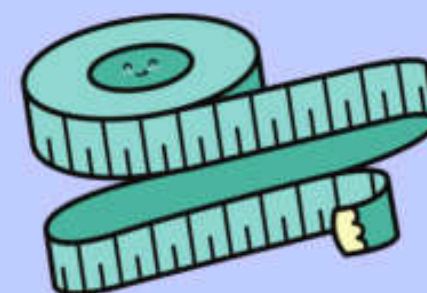
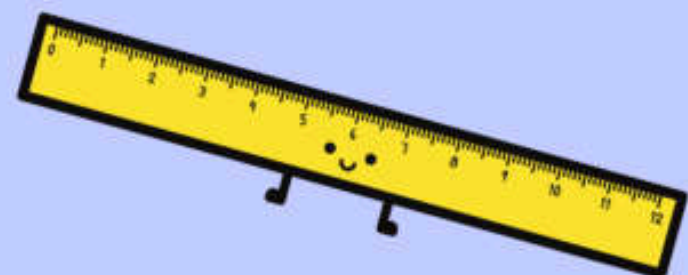
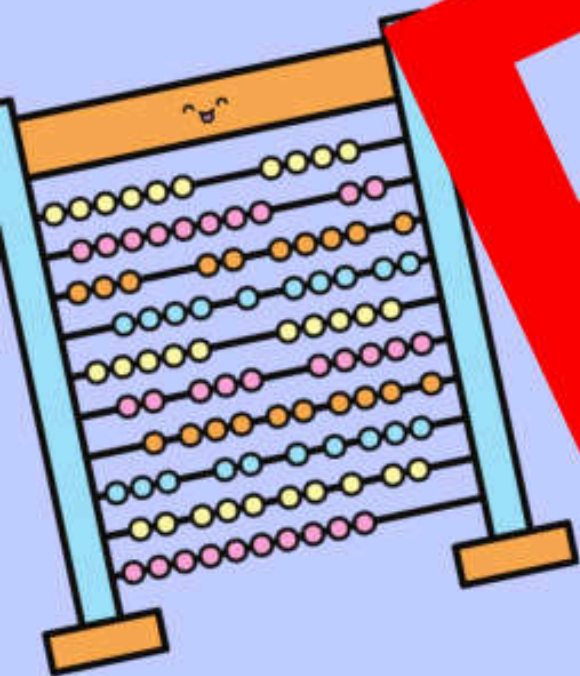
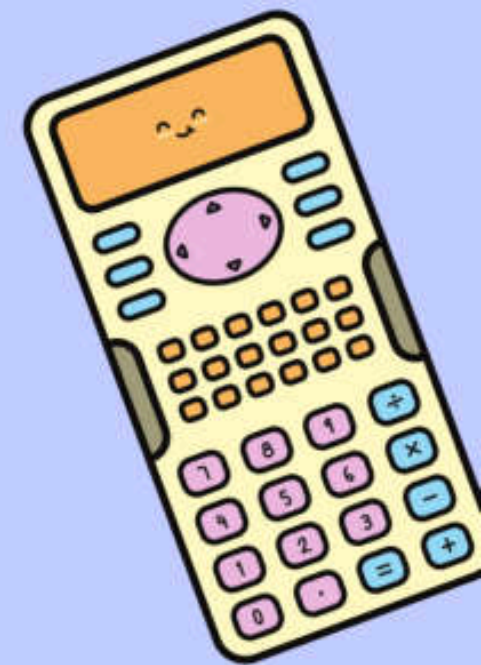
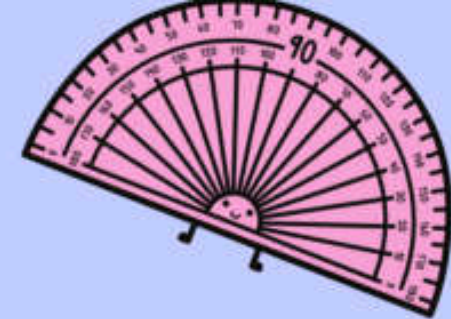
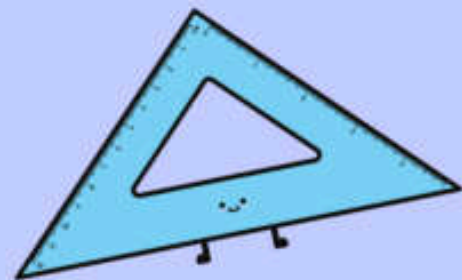
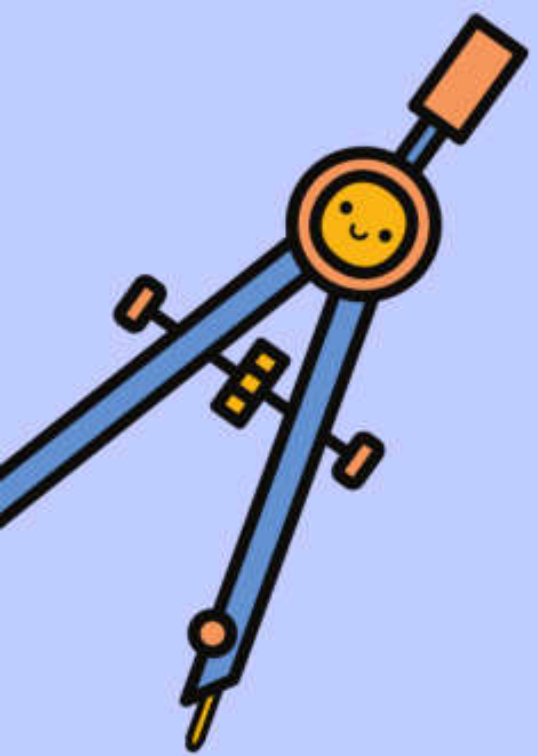
Predict each outcome using fractions.

Run at least 30 trials for each experiment.

Compare prediction with observed frequency.

Explain any difference using probability language.

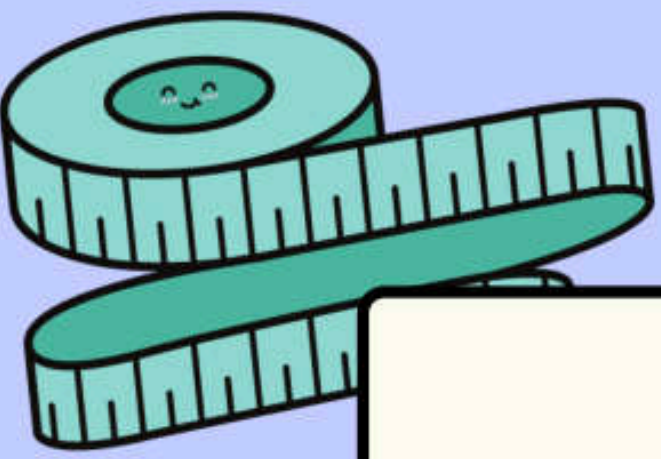




Well Done!

Year 5 Probability Quiz

PREVIEW



QUESTION 1

Which is the complete sample space for one fair die roll?

A $\{1, 2, 3, 4, 5\}$

B $\{0, 1, 2, 3, 4, 5\}$

C $\{1, 2, 3, 4, 5, 6\}$

D $\{\text{odd, even, prime}\}$



ANSWER 1

$\{1, 2, 3, 4, 5, 6\}$

These are all six possible outcomes, with none missing.



QUESTION 2

True or false?

A fair spinner has four equal sections:

red, blue, green and yellow.

Each colour is equally likely.



ANSWER 2

PREVIEW

True
Equal sections on a spinner give equal chances.



QUESTION 3

A fair die is rolled

What is $P(\text{number greater than } 4)$?

Give the fraction in simplest form.



ANSWER 3

Outcomes greater than 4: {5, 6}

$$P(\text{number greater than 4}) = 2/6 = 1/3$$



QUESTION 4

A fair spinner has equal sectors:

5 blue, 2 yellow and 3 red

All colours are equally likely

Which colour is most likely

A Red is most likely

B Blue is most likely

C Blue is most likely

D Yellow is impossible



ANSWER 4

PREVIEW

Blue is most likely.

Blue covers 5 of the 8 equal sectors, so $P(\text{blue}) = 5/8$.



QUESTION 5

True or false?

A coin comes up heads four times in a row.

Is it now more likely on the next toss.



ANSWER 5

PREVIEW

Each toss is independent, so $P(\text{heads})$ stays $1/2$.

FAL



QUESTION 6

One card is chosen at random
from a standard 52-card deck.

What is $P(\text{heart})$?

Give the fraction in simplest form.



ANSWER 6

There are 13 hearts in 52 cards.

$$P(\text{heart}) = 13/52 = 1/4$$



QUESTION 7

Two fair dice are rolled.
What total is most likely?

A 1

B 5

C 7

D 12



ANSWER 7

PREVIEW

It has 6 of the 2 recorded incomes, more than any other total.

A total of 7



QUESTION 8

True or false?

If $P(\text{spinner has blue}) = 1/2$,

exactly 10 of the next 20 spins

must be blue.



ANSWER 8

PREVIEW

FAS

en by 2 s are expected, not guaranteed.

observed frequency can vary.



QUESTION a

Team A rolls a 6 in 3 of 10 trials.

Team B rolls a 6 in 3 of 100 trials.

Which is closer to theoretical $P(6) = 1/6$?

Show the comparison.



ANSWER 9

Team A: $8/40 = 0.2$

Team B: $16/100 = 0.16$

Exact: $1/6 \approx 0.167$

Team B is closer.



QUESTION 10

A fair die is rolled once. Which player is farest?

A Player 1 wins on 1; Player 2 otherwise

B Player 1 wins on odd; Player 2 on even

C Player 1 wins on 1–4; Player 2 on 5–6

D Player 1 wins on 6; Player 2 on 1

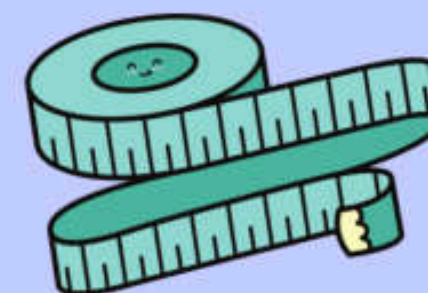
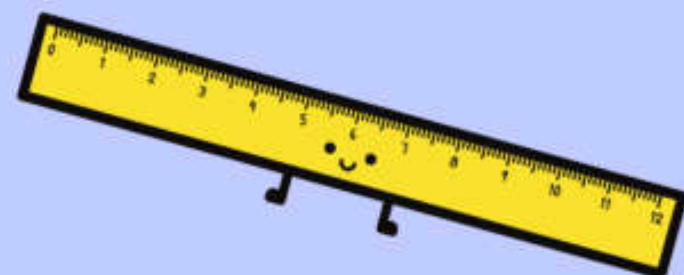
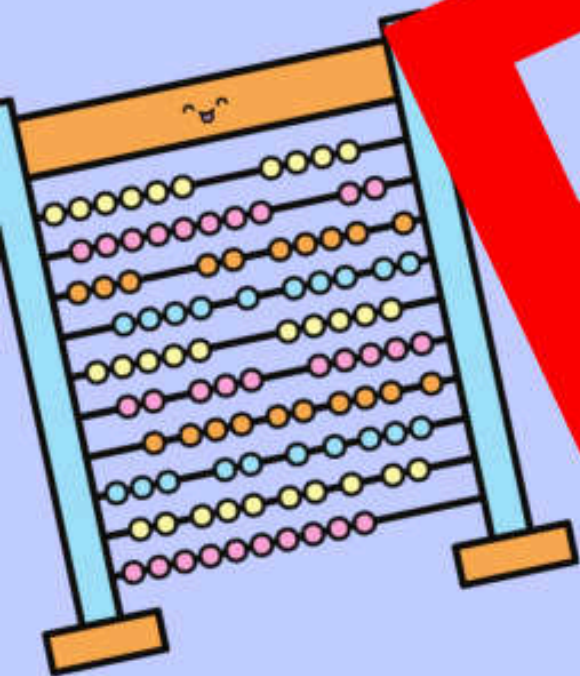
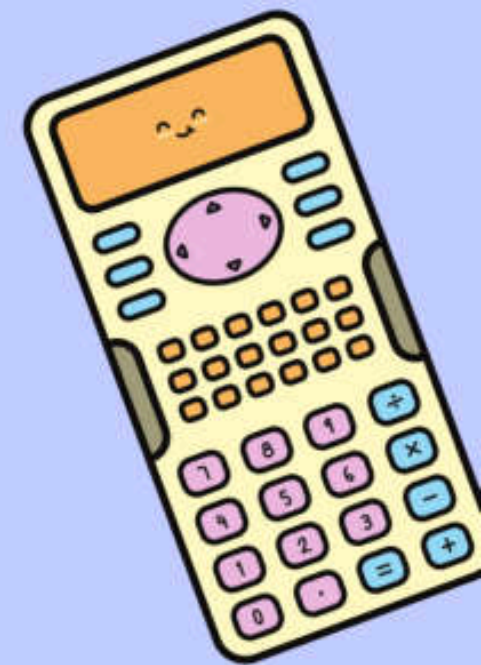
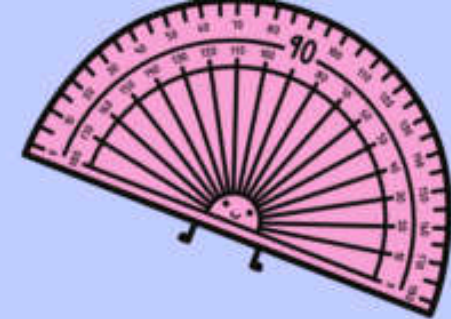
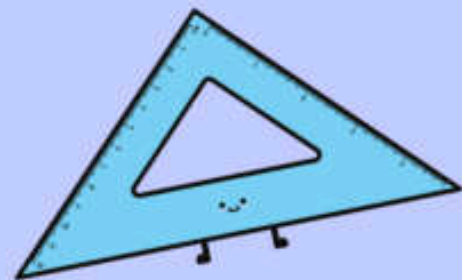
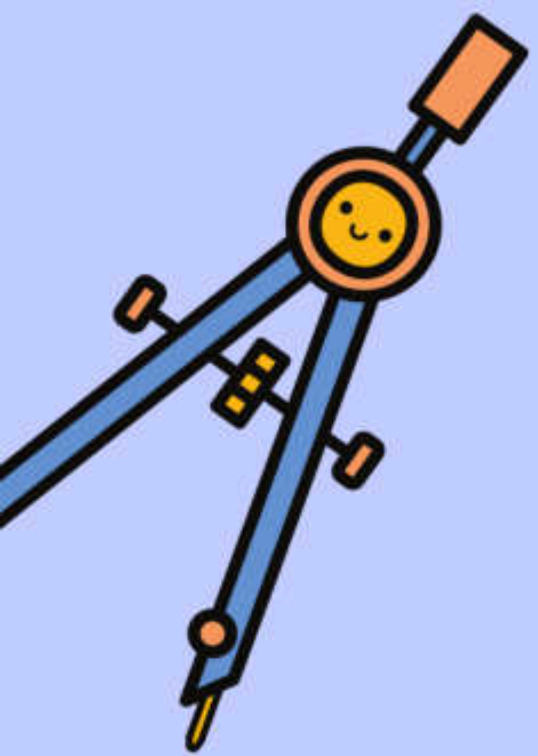


ANSWER 10

B Odd vs even

Each player has 3 of the 6 equally likely outcomes,
so each has probability $1/2$.





Well Done!