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Collecting and Representing Data - Year 3

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Data Investigation Cycle



Graph Features at a Glance



Every feature helps the reader understand the data.

Survey Studio - Question Cards

Choose a card. Ask 12-20 people. Tally one response each. Represent and interpret the data.

1

Favourite school activity?



- Reading
- Sport
- Art
- Music

2

How do you travel to school?



- Walk
- Bike or scooter
- Car
- Bus

3

Best fruit?



- Apple
- Banana
- Orange
- Berries

4

Preferred wet-day game?



- Drawing
- Board games
- Reading
- Construction

5

Most useful playground area?



- Climbing
- Swings
- Ball court
- Quiet space

6

Favourite garden visitor?



- Butterfly
- Bee
- Bird
- Ladybird

Survey Studio - Tally Sheet

★ Year 3 Mathematics ★

Surveyor:

Question:

Target number
of respondents:

Category	Tally	Total



Record one tally for each response.
Count every tally group carefully.



Survey Studio - Compare Two Groups

Surveyor:

Question:

Group A:

Group B:

Category	Group A tally	Group A total	Group B tally	Group B total

★ > What is the biggest difference between the groups?

★ > What is one similarity?

Survey Studio - Representation Planner

PLAN YOUR SURVEY

Question

Title

Categories

☐ Picture graph

☐ Column graph

DRAW YOUR GRAPH



LABEL AND ANALYSE

Key or scale

Horizontal-axis label

Vertical-axis label

The most common response was...

The least common response was...

The data suggests...



Graph Match-Up



- 1 Shuffle the cards.
- 2 Build each set with one data table, one graph and one interpretation.
- 3 Explain why the three cards match.
- 4 Check the key.



SET A

DATA TABLE

GRAPH

INTERPRETATION

SET B

DATA TABLE

GRAPH

INTERPRETATION

SET C

DATA TABLE

GRAPH

INTERPRETATION

SET D

DATA TABLE

GRAPH

INTERPRETATION

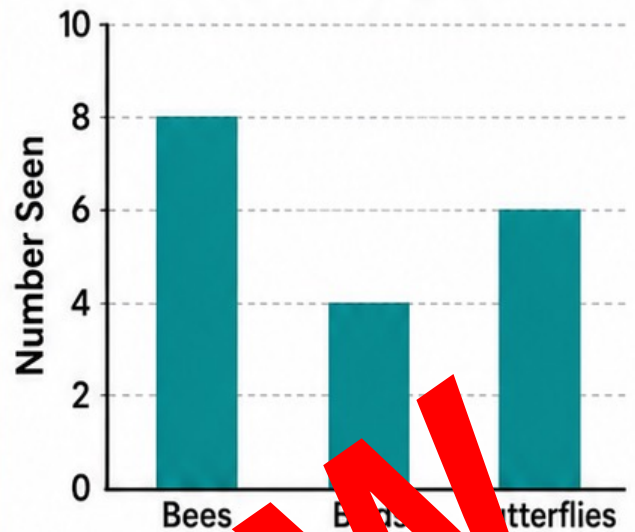
Graph Match-Up - Card Sheet A

Garden Visitors

Visitor	Number Seen
Bees	8
Birds	4
Butterflies	6

A1

Garden Visitors



Bees were seen most often, with 8 sightings.

A3

Books Borrowed

Genre	Number Borrowed
Adventure	10
Animals	6
Space	8

B1

Books Borrowed

Genre	Number of Books
Adventure	    
Animals	  
Space	   

1 book symbol = 2 books

B2

Adventure books were borrowed 4 more times than animal books.

B3

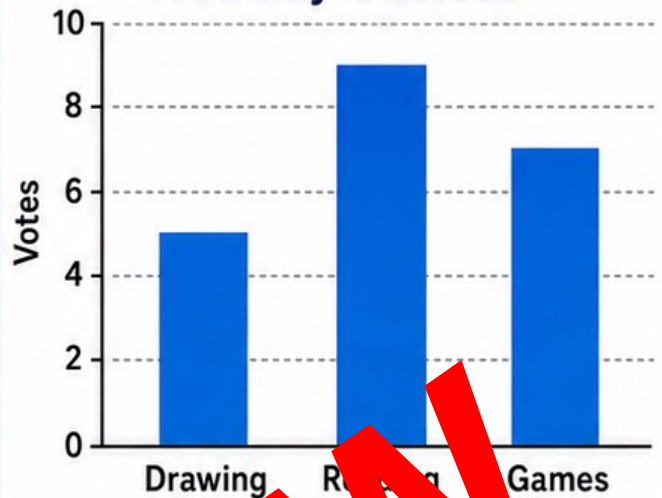
Graph Match-Up - Card Sheet B

Wet-Day Choices

Choice	Votes
Drawing	5
Reading	9
Games	7

C1

Wet-Day Choices



Reading was the most popular choice, with 9 votes.

C3

Fruit Bowls Sold

Fruit	Bowls Sold
Apple	12
Banana	8
Berry	10

D1

Fruit Bowls Sold

 1 bowl symbol = 2 bowls

Apple	     
Banana	   
Berry	    

D2

Four more apple bowls than banana bowls were sold.

D3

Graph Match-Up - Self-Check Key

1 SET A: A1 + A2 + A3



Bees were seen most often,
with **8** sightings.



2 SET B: B1 + B2 + B3



Adventure books were
borrowed **4** more times
than animal books.



3 SET C: C1 + C2 + C3



Reading was the most
popular choice, with
9 votes.



4 SET D: D1 + D2 + D3



Four more apple bowls
than banana bowls
were sold.

Apple	Banana
 	 
 	 



Explain the evidence before checking the code.

Data Detective Board Game

Mathematics

START



RULES

Roll one die. Move. Draw a card that matches the icon.

Record your answer. Correct answer = stay. Try again next turn if needed.

Data Detective - Cards 1-12

1



What does a tally record?

2



What does a picture-graph key tell you?

3



Name one feature of a column graph.

4

4, 9, 6

Values are 4, 9, 6. Which is greatest?

5

$$12 - 7 = ?$$

Find the difference between 12 and 7.

6



What should every graph have at the top?

7



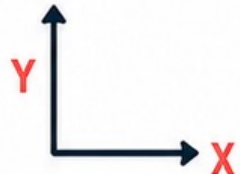
True or false: scale intervals must be equal.

8



One star = 2 votes. What do 4 stars mean?

9



Which axis usually shows categories?

10

3, 5, 6

What is the total of 3, 5 and 6?

11



Why do we collect data?

12

8, 2, 5

Name the least value: 8, 2, 5.

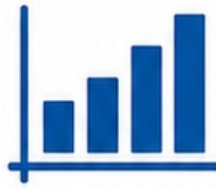
Data Detective - Cards 13-24

13



One book = 4 books.
What does half a
book mean?

14



What does
frequency mean?

15



Which graph
uses columns?

16



Data: Cats 6,
Dogs 10.
How many more
dogs?

17



What should you
check after drawing
columns?

18



True or false:
a graph may omit
category labels.

19



Which is clearer for
exact comparisons:
column graph
or story?

20



What is
 $7 + 8 + 5$?

21



Name one way
to collect data.

22



What makes a
survey question fair?

23



What should a
conclusion include?

24



Data: Red 4, Blue 9,
Green 7. Which
colour is most
common?

Data Detective - Answer Key

1 one response	13 2 books
2 the value of each symbol	14 how often a value occurs
3 title, axis, labels, scale, columns or grid	15 column graph
4 9	16 4
5 5	17 might not match the scale
6 a title	18 false
7 true	19 column graph
8 8 years	20 20
9 horizontal axis	21 survey, observation or experiment
10 14	22 same clear question and choices
11 to answer a question	23 evidence from the data
12 2	24 blue



Data Detective - Player Recording Sheet

Year 3 Mathematics



Player:

Partner:

Date:

Turn	Card number	My answer	Checked
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Reflection

One graph feature I remembered...



One skill I will practise...

Picture Graph Builder

#

Challenge number

Graph title



Key: 1 symbol = ____

☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐



CHECKLIST

☐

Title

☐

Categories

☐

Correct number of symbols

☐

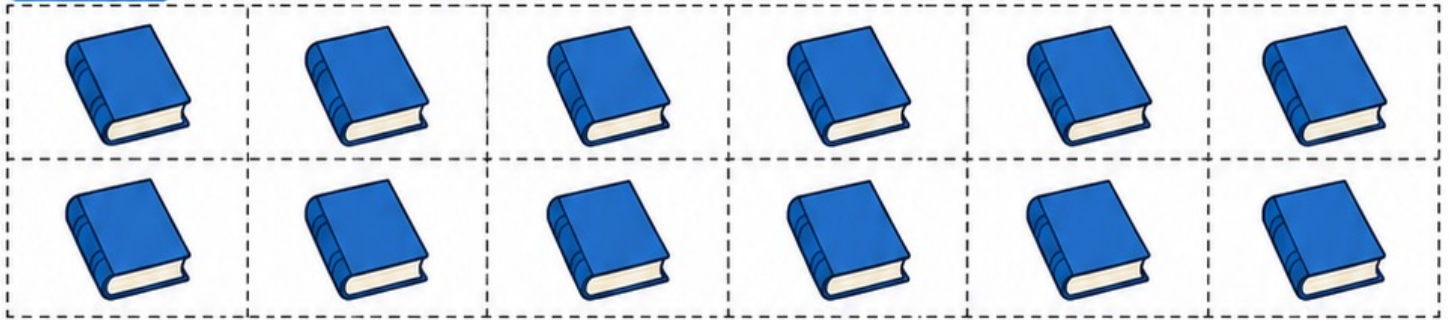
Key

☐

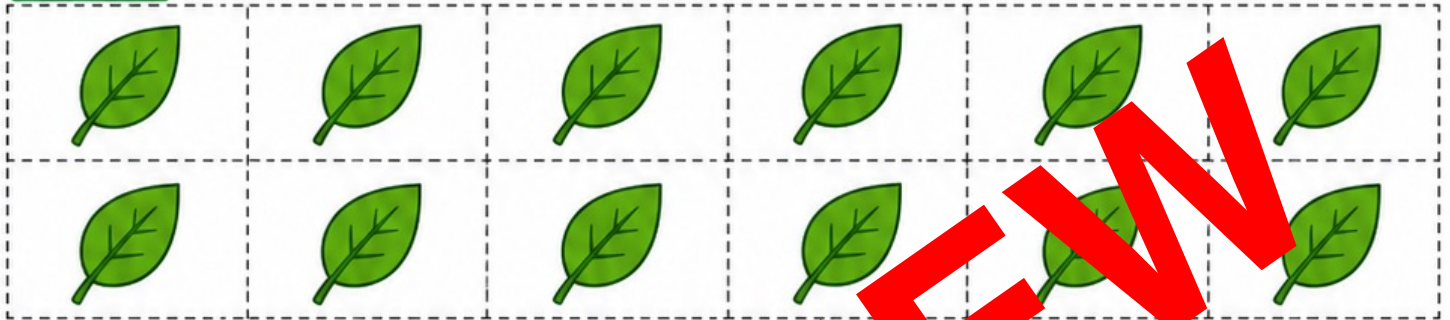
Two data statements

Picture Graph Builder - Icon Tiles

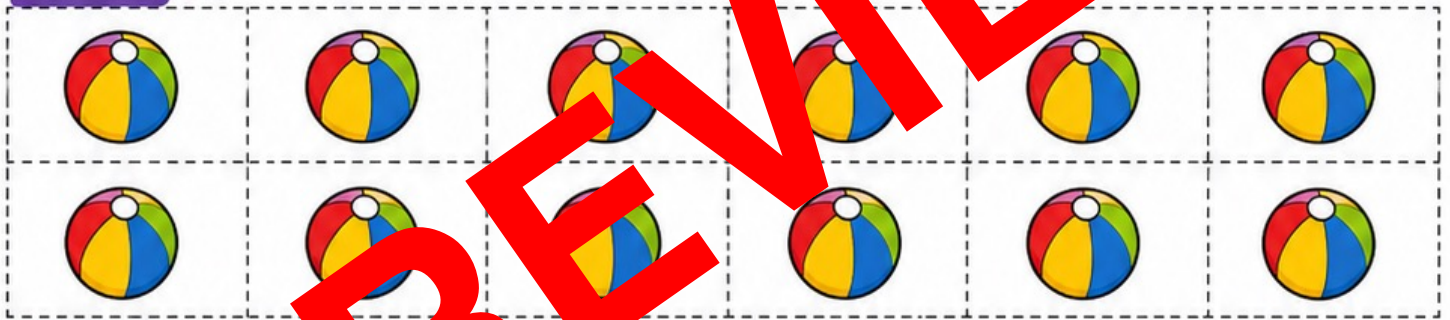
BOOKS



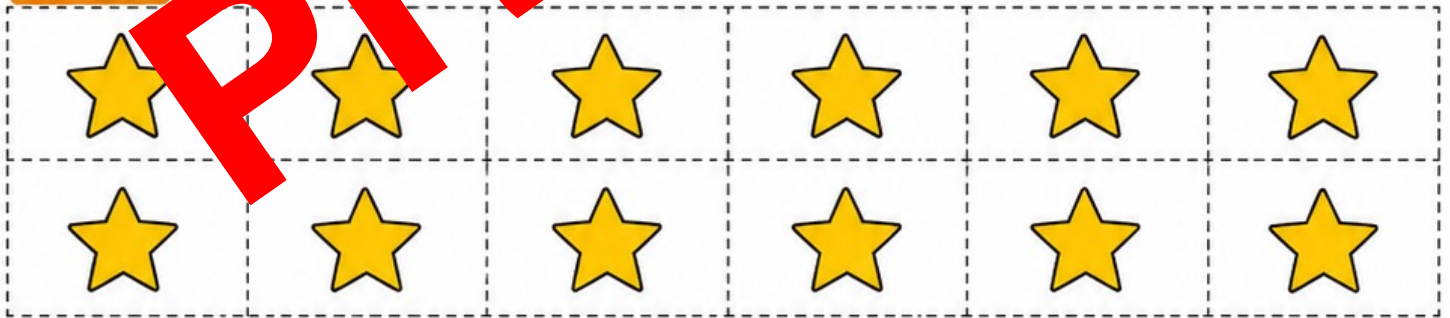
LEAVES



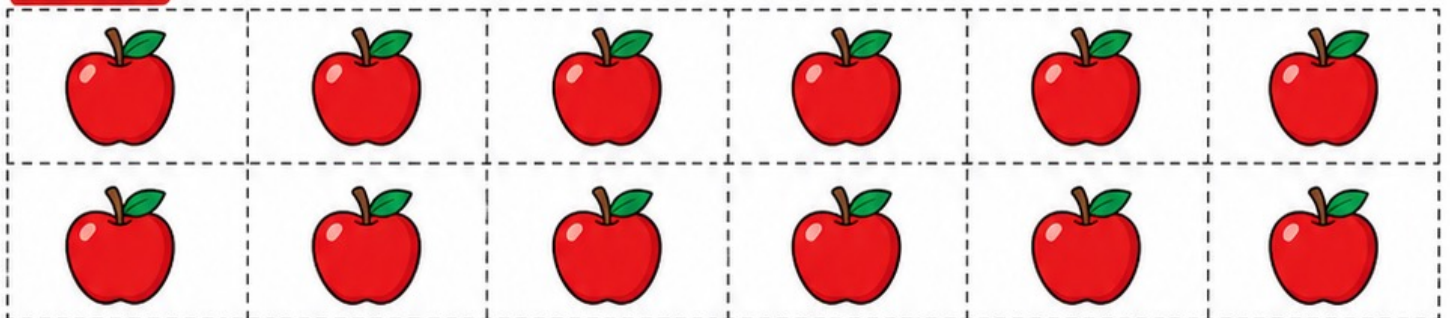
BALLS



STARS



APPLES



Picture Graph Builder - Challenge Cards

1

Books:

Adventure 8,
Animals 4,
Space 10,
Mystery 6.



Key 1 symbol = 2.

2

Garden:

Herbs 6,
Flowers 10,
Vegetables 8,
Fruit 4.



Key 1 symbol = 2.

3

Sports:

Soccer 12,
Tennis 6,
Swimming 8,
Cycling 10.



Key 1 symbol = 2.

4

Weather:

Sunny 15,
Cloudy 10,
Rainy 5,
Windy 10.



Key 1 symbol = 5.

5

Snacks:

Fruit 6,
Crackers 6,
Yogurt 10,
Popcorn 4.



Key 1 symbol = 2.

6

Transport:

Walk 6,
Bike 8,
Car 12,
Bus 4.



Key 1 symbol = 2.

7

Pets:

Dogs 10,
Cats 6,
Birds 8,
Rabbits 4.



Key 1 symbol = 2.

8

Games:

Drawing 5,
Reading 10,
Blocks 15,
Cards 10.



Key 1 symbol = 5.

Picture Graph Builder - Partner Check

Builder

Checker

Challenge number

Title

Key

Category	Frequency	Symbols shown	Correct?

☐ The title matches the data

☐ The key is used correctly

☐ The symbols are equal in size

☐ The graph shows every category

Evidence statement 1

Evidence statement 2

Name: _____

Tally and Total Tables - Page 1

School Garden Visitors		
Visitor	Tally	Total
Butterflies		
Bees		
Ladybirds		
Birds		

- 1

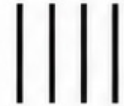
Which visitor was seen most often?
- 2

Which visitor was seen least often?
- 3

How many visitors were seen altogether?
- 4

How many more bees than butterflies were seen?

Tally and Total Tables - Page 1

School Garden Visitors		
Visitor	Tally	Total
Butterflies		6
Bees		9
Ladybirds		4
Birds		2

1 Which visitor was seen most often?

Bees

2 Which visitor was seen least often?

Birds

3 How many visitors were seen altogether?

21 visitors

4 How many more bees than butterflies were seen?

3 more bees

Name: _____

Tally and Total Tables - Page 2

Use the lunch-fruit responses to complete the tally and total table.

Apple, Pear, Banana, Apple, Orange, Pear, Apple, Banana,
Apple, Pear, Orange, Apple, Banana, Pear, Apple, Apple,
Orange, Banana, Pear, Apple

Fruit	Tally	Total
Apple		
Pear		
Banana		
Orange		

- 1 Which fruit was chosen most?

- 2 Which fruit was chosen least?

- 3 How many responses were recorded?

Tally and Total Tables - Page 2

Use the lunch-fruit responses to complete the tally and total table.

Apple, Pear, Banana, Apple, Orange, Pear, Apple, Banana,
Apple, Pear, Orange, Apple, Banana, Pear, Apple, Apple,
Orange, Banana, Pear, Apple

Fruit	Tally	Total
Apple		8
Pear		5
Banana		4
Orange		3

1 Which fruit was chosen most?

Apple

2 Which fruit was chosen least?

Orange

3 How many responses were recorded?

20 responses

Name: _____

Reading Picture Graphs - Page 1

Pets Seen at the Park	
Dogs	    
Cats	  
Birds	   
Rabbits	 

1 paw = 2 pets

- 1 How many dogs were seen? _____
- 2 How many birds were seen? _____
- 3 Which pet was seen least? _____
- 4 How many more dogs than rabbits were seen? _____
- 5 How many pets were seen altogether? _____

Reading Picture Graphs - Page 1

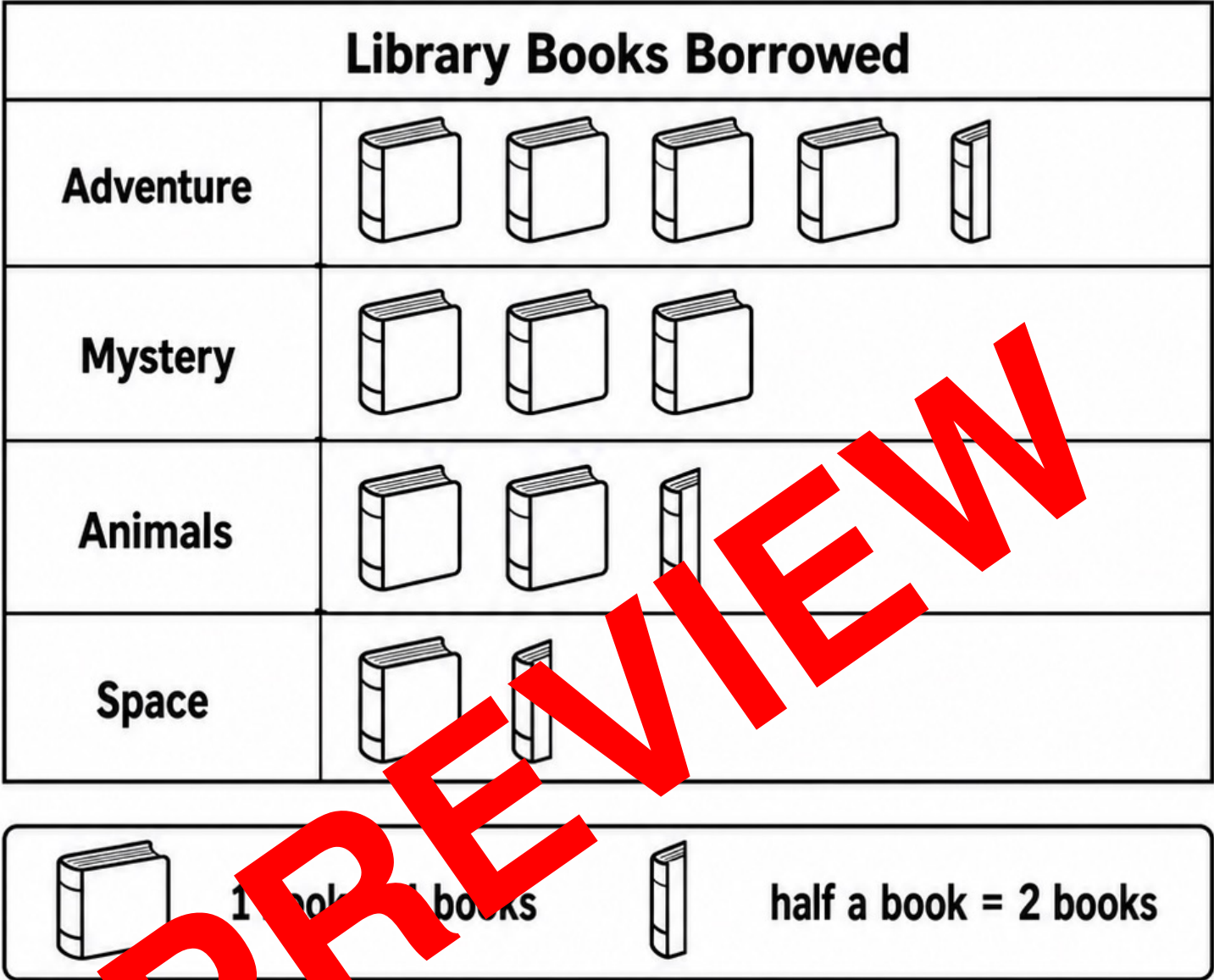
Pets Seen at the Park	
Dogs	    
Cats	  
Birds	   
Rabbits	 

1 paw = 2 pets

- How many dogs were seen? 10 dogs
- How many birds were seen? 8 birds
- Which pet was seen least? Rabbits
- How many more dogs than rabbits were seen? 6 more dogs
- How many pets were seen altogether? 28 pets

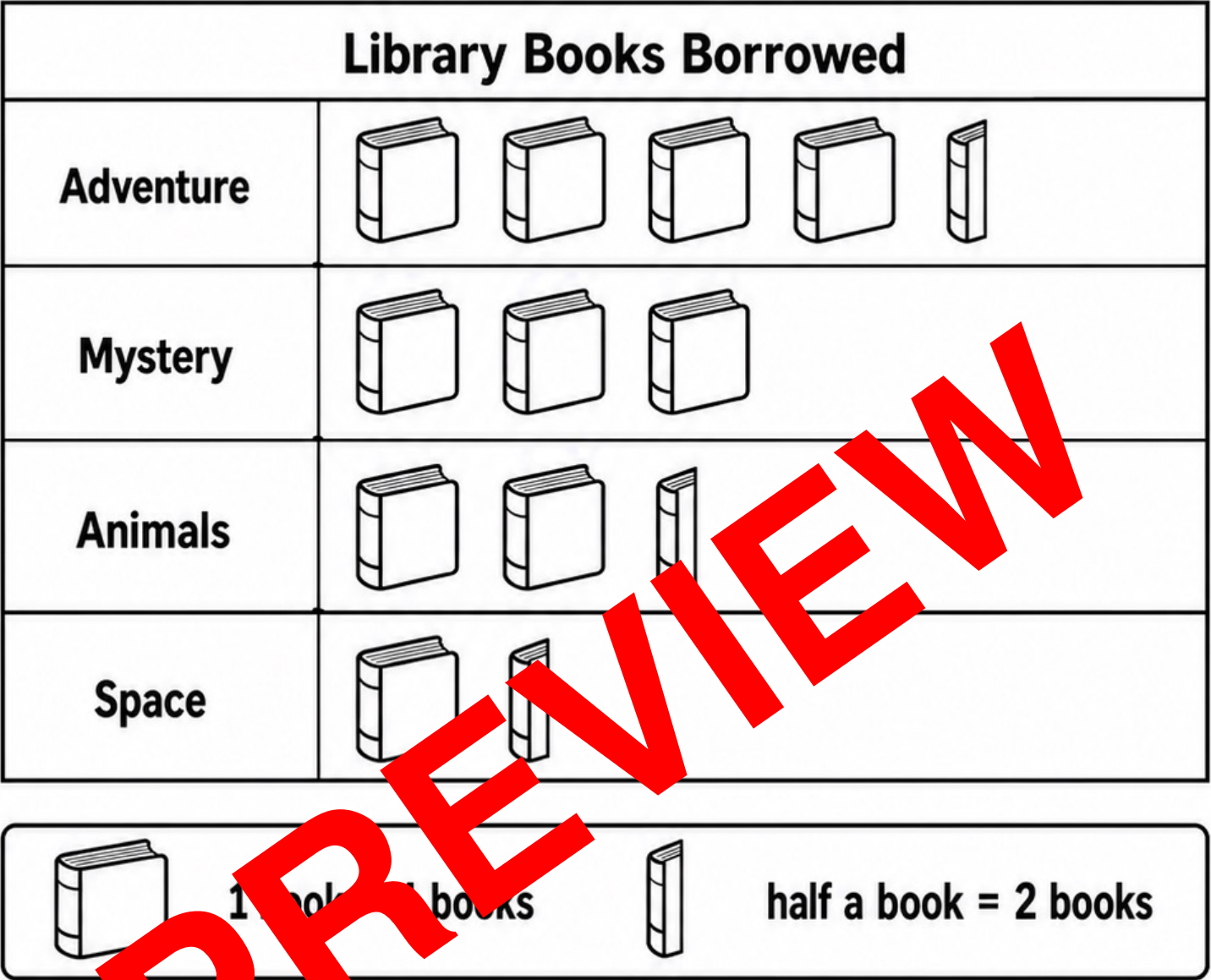
Name: _____

Reading Picture Graphs - Page 2



- 1 What does half a symbol represent? _____
- 2 How many adventure books were borrowed? _____
- 3 How many more adventure than animal books? _____
- 4 How many books altogether? _____
- 5 Which two categories have a total of 18 books? _____

Reading Picture Graphs - Page 2



- 1

What does half a symbol represent?

2 books
- 2

How many adventure books were borrowed?

18 books
- 3

How many more adventure than animal books?

8 more
- 4

How many books altogether?

46 books
- 5

Which two categories have a total of 18 books?

Mystery and Space

Name: _____

Building Picture Graphs – Page 1

Fruit Smoothies Sold	
Mango	12
Berry	8
Banana	10
Apple	6

Use the key 1 cup = 2 smoothies. Draw a picture graph that matches the table.

Mango	
Berry	
Banana	
Apple	

Title: _____

1 cup = 2 smoothies

Write one statement supported by your graph.

Building Picture Graphs – Page 1

Fruit Smoothies Sold	
Mango	12
Berry	8
Banana	10
Apple	6

Use the key 1 cup = 2 smoothies. Draw a picture graph that matches the table.

Mango	
Berry	
Banana	
Apple	

Title: Fruit Smoothies Sold

1 cup = 2 smoothies

Write one statement supported by your graph.

Mango was the best-selling flavour with 12 smoothies.

Name: _____

Building Picture Graphs - Page 2

Picnic Snack Survey	
Pretzels	8
Popcorn	12
Fruit	6
Crackers	10

Choose a useful key and create a complete picture graph.

Pretzels	
Popcorn	
Fruit	
Crackers	

Title: _____

Key: 1 symbol = ____ votes

Statement 1: _____

Statement 2: _____

Building Picture Graphs - Page 2

Picnic Snack Survey	
Pretzels	8
Popcorn	12
Fruit	6
Crackers	10

Choose a useful key and create a complete picture graph.

Pretzels	   
Popcorn	     
Fruit	  
Crackers	    

Title: Picnic Snack Survey

Key: 1 symbol = 2 votes

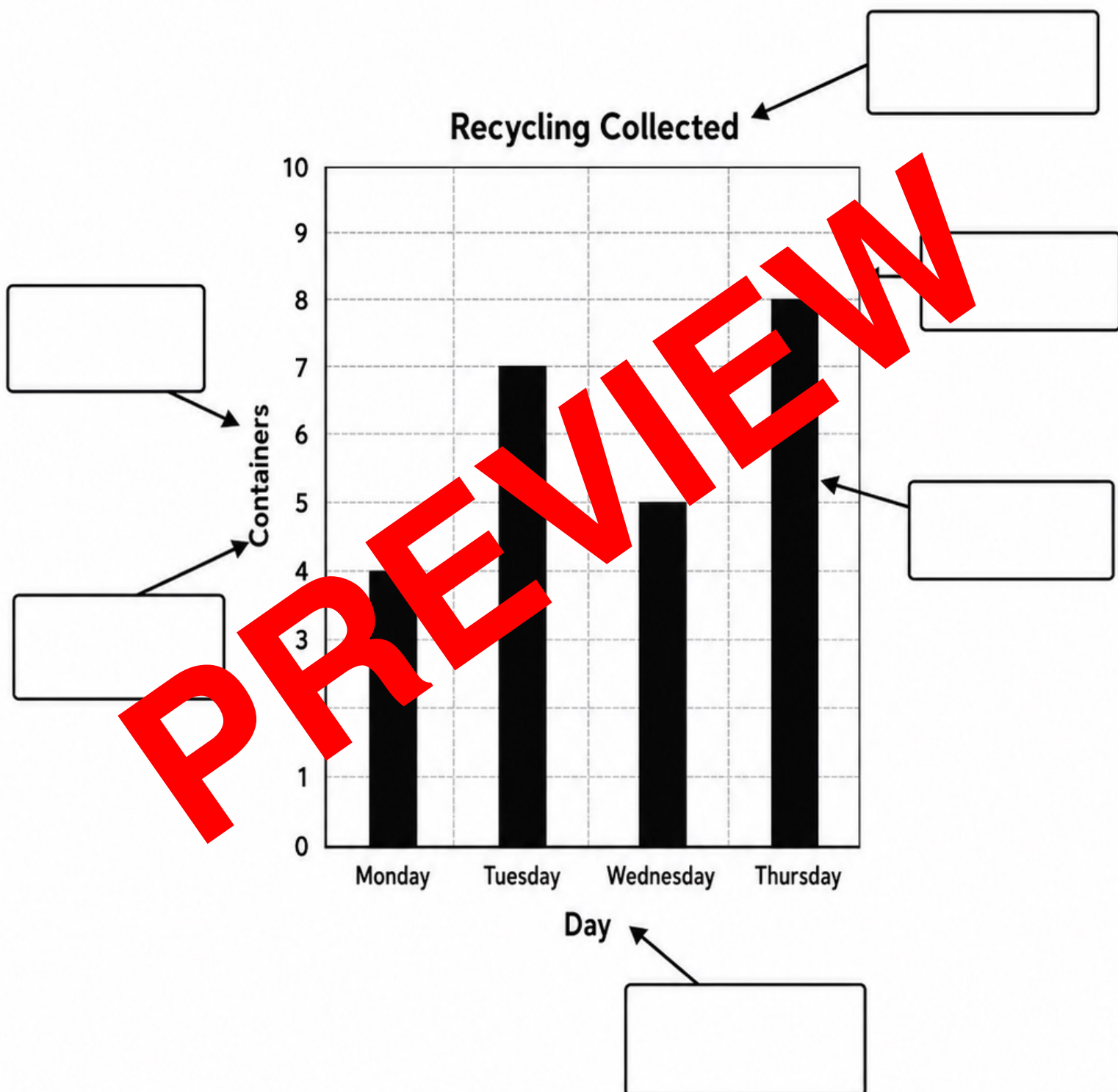
Statement 1:
Popcorn was most popular with 12 votes.

Statement 2:
Fruit had 6 fewer votes than popcorn.

Name: _____

Parts of a Column Graph

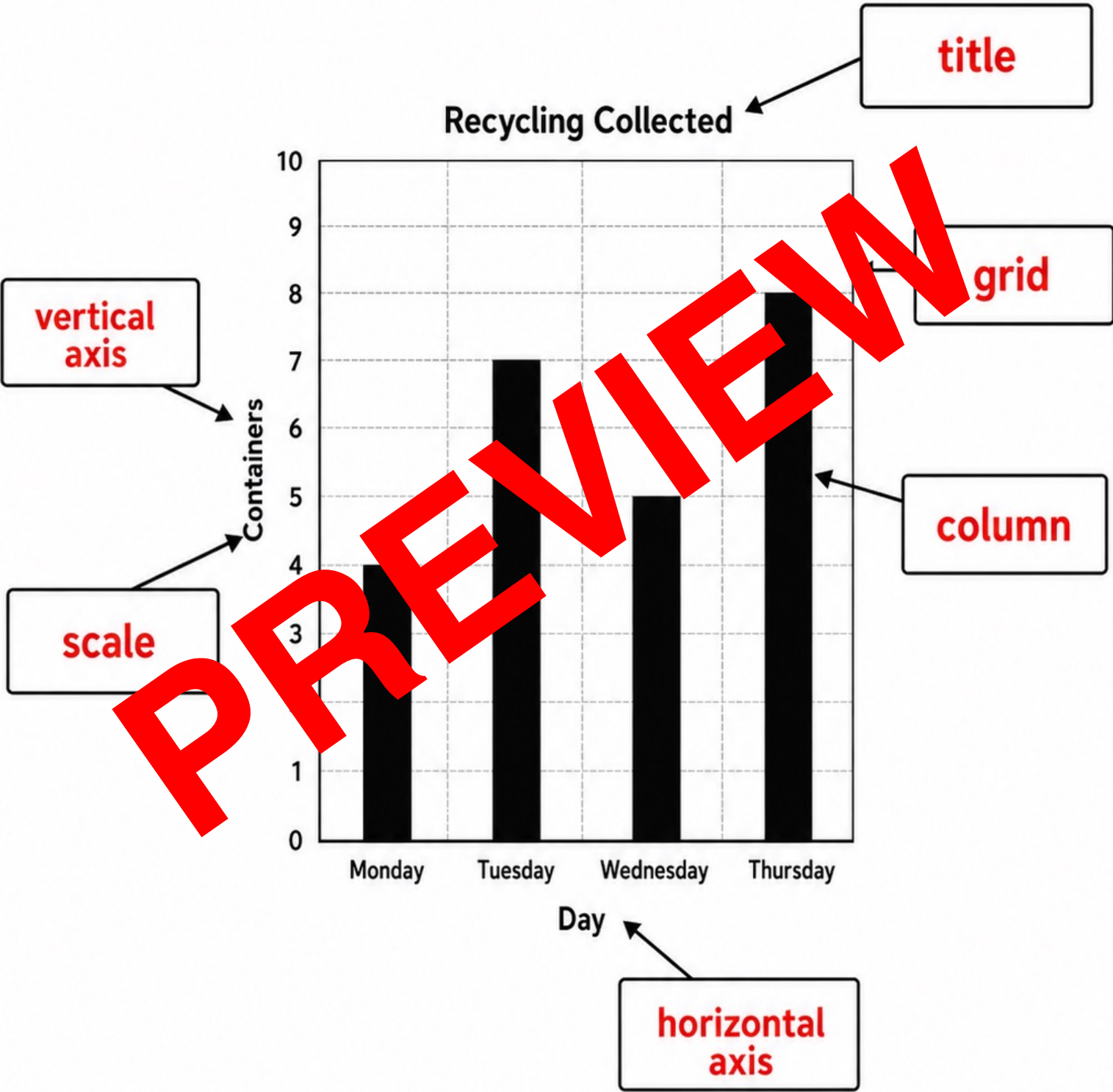
Use these labels: title, horizontal axis, vertical axis, scale, column, grid.



ANSWERS

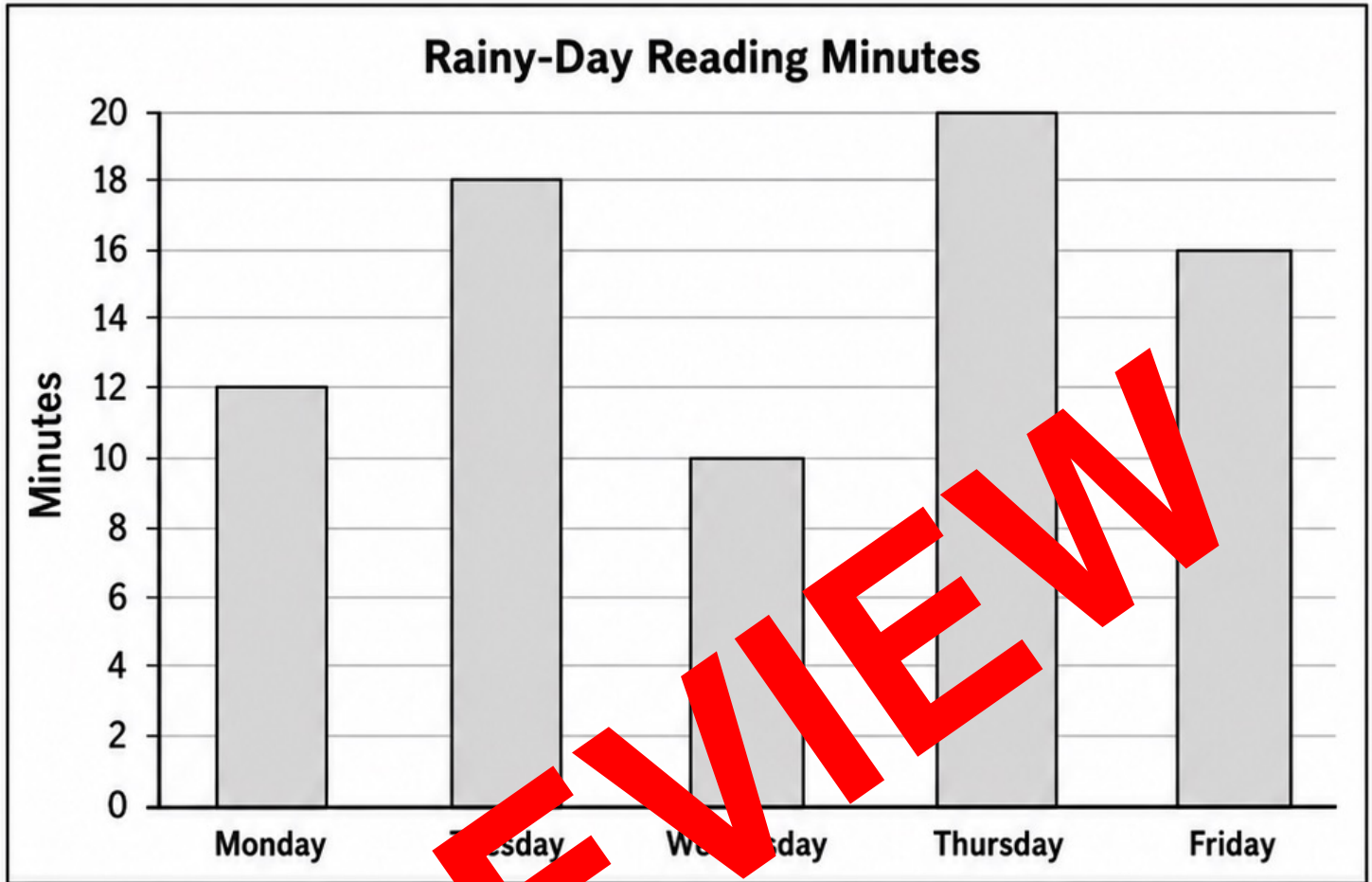
Parts of a Column Graph

Use these labels: title, horizontal axis, vertical axis, scale, column, grid.



Name: _____

Reading Column Graphs - Page 1



- ① Which day had the most reading?

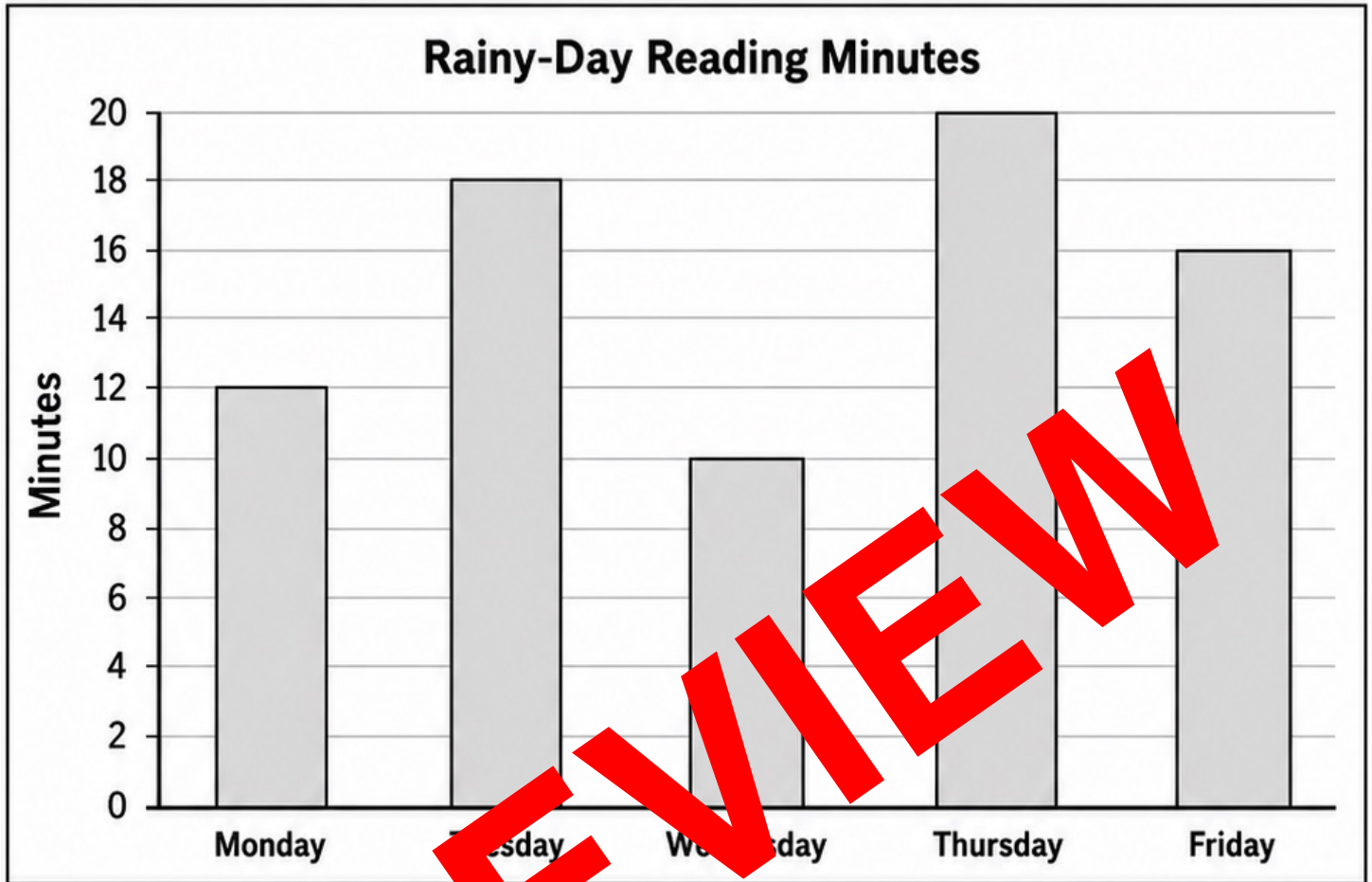
- ② Which day had the least?

- ③ What is the difference between Thursday and Wednesday?

- ④ What is the total for Monday and Friday?

- ⑤ Write one accurate statement about the graph.

Reading Column Graphs - Page 1

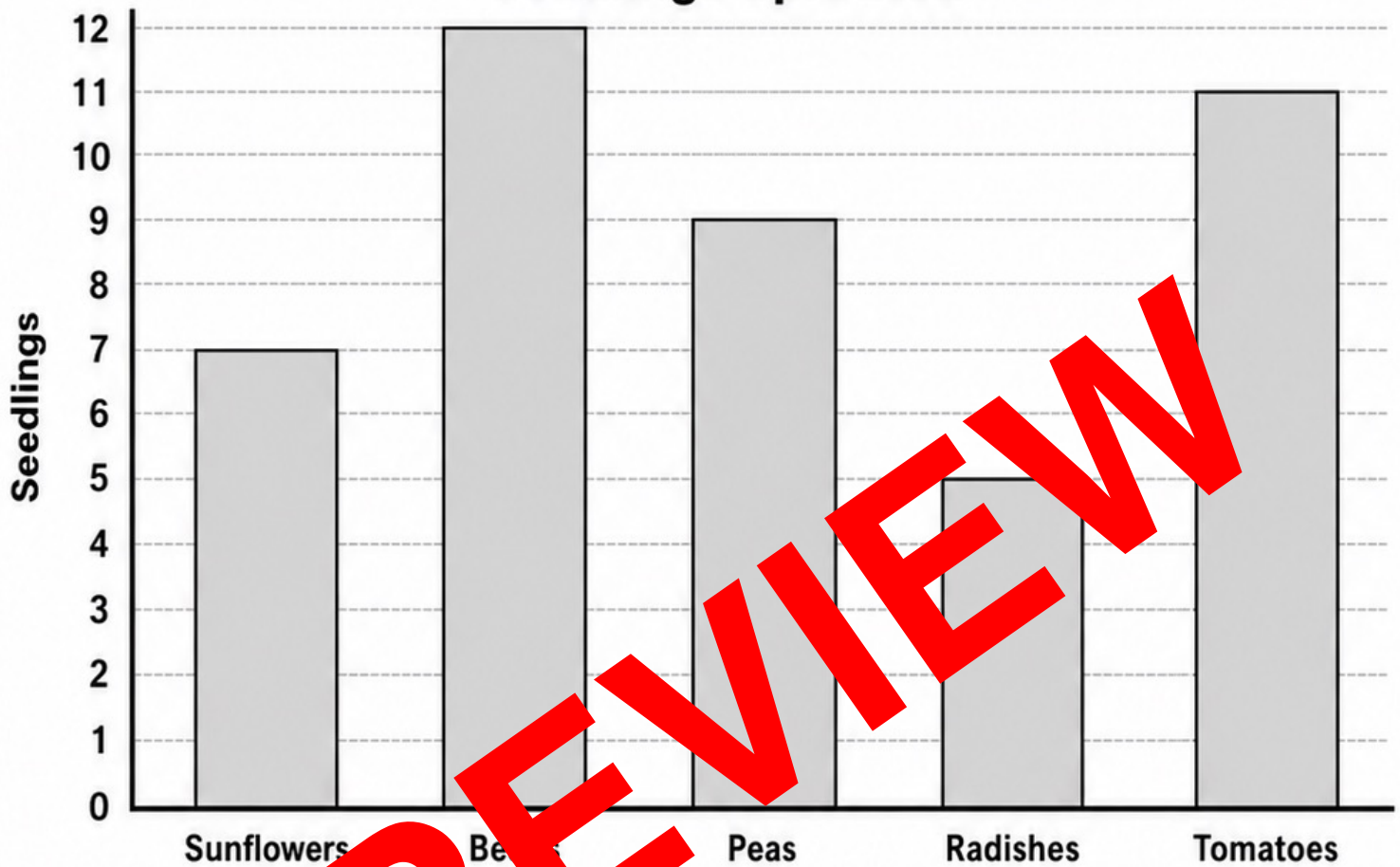


- ① Which day had the most reading?
Thursday
- ② Which day had the least?
Wednesday
- ③ What is the difference between Thursday and Wednesday?
10 minutes
- ④ What is the total for Monday and Friday?
28 minutes
- ⑤ Write one accurate statement about the graph.
Example: Thursday had the most reading time with 20 minutes.

Name: _____

Reading Column Graphs - Page 2

Seedlings Sprouted

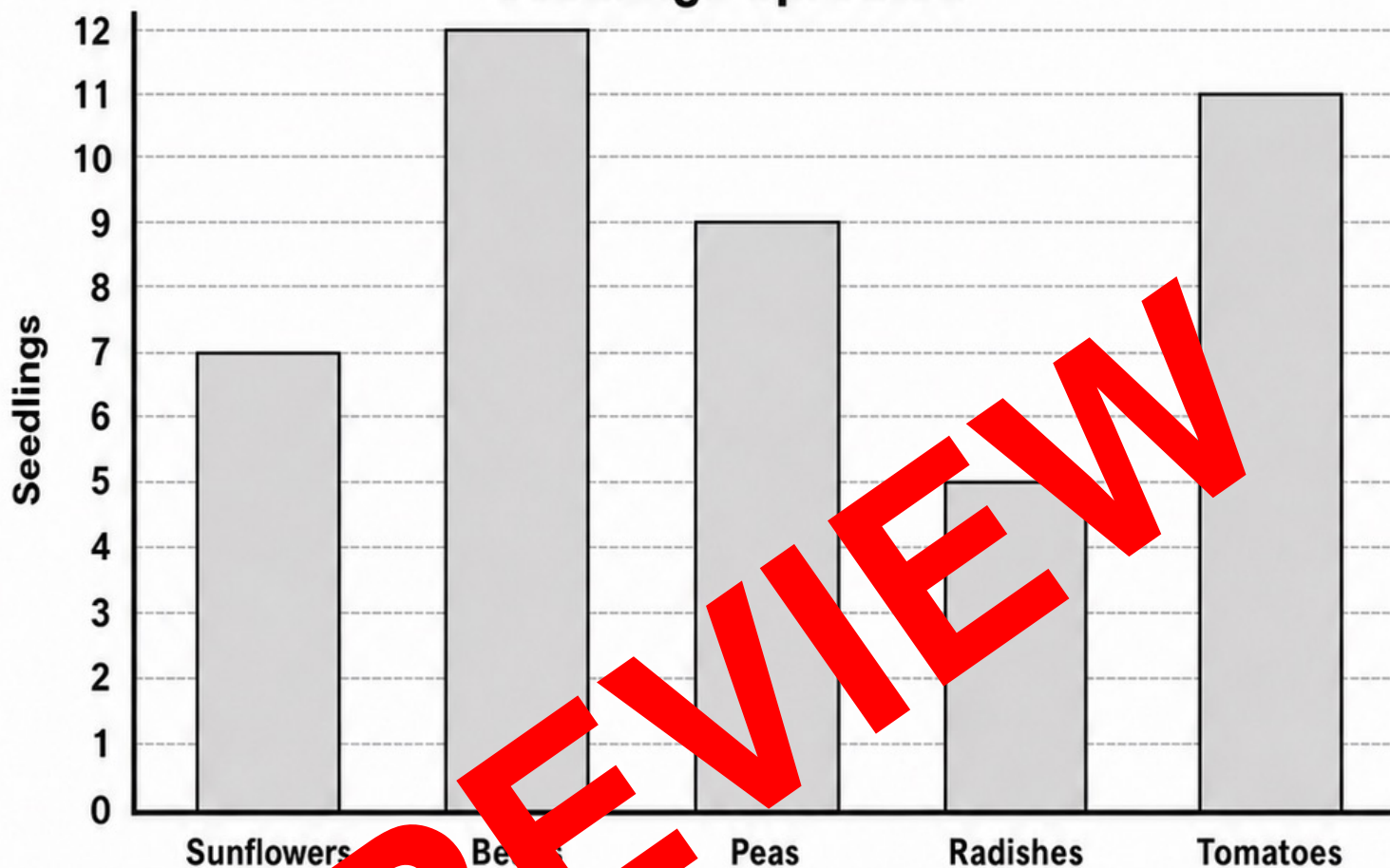


- 1 Which category had the most seedlings? _____
- 2 How many more beans than radishes? _____
- 3 What is the total for beans and tomatoes? _____
- 4 Which two categories differ by 2? _____
- 5 Put the categories in order from least to greatest.

ANSWERS

Reading Column Graphs - Page 2

Seedlings Sprouted



- 1 Which category had the most seedlings? Peas
- 2 How many more beans than radishes? 7 seedlings
- 3 What is the total for beans and tomatoes? 23 seedlings
- 4 Which two categories differ by 2? Peas and Tomatoes
- 5 Put the categories in order from least to greatest. Radishes, Sunflowers, Peas, Tomatoes, Beans

Name: _____

Building Column Graphs - Page 1

Recess Activities	
Soccer	9
Skipping	5
Handball	12
Drawing	4

Create a complete column graph from the table.



Graph title: _____

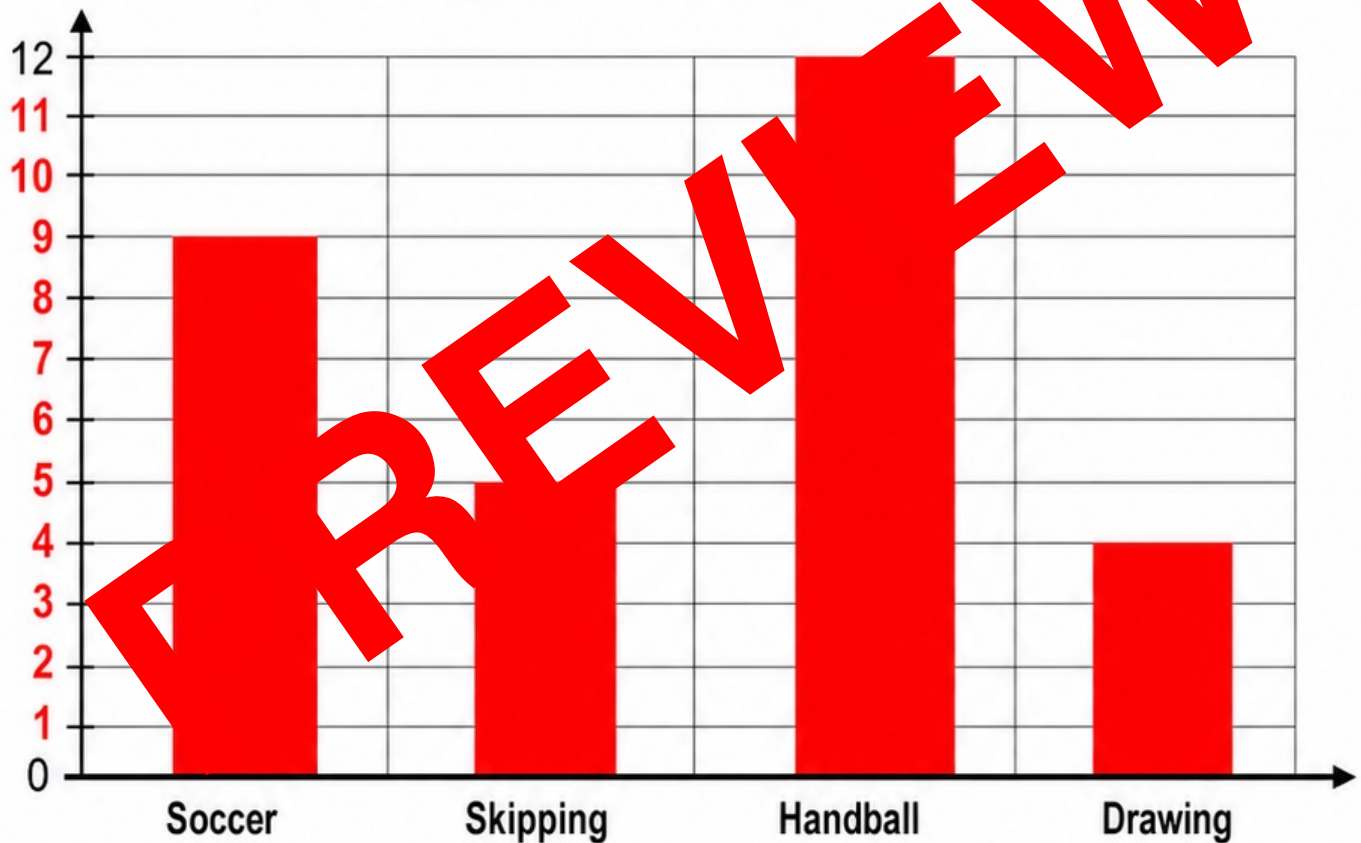
Vertical-axis label: _____

- ☐ title
- ☐ axis labels
- ☐ even scale
- ☐ accurate columns

Building Column Graphs - Page 1

Recess Activities	
Soccer	9
Skipping	5
Handball	12
Drawing	4

Create a complete column graph from the table.



Graph title: Favourite Recess Activities

Vertical-axis label: Students

- ☒ title
- ☒ axis labels
- ☒ even scale
- ☒ accurate columns

Name: _____

Building Column Graphs - Page 2

Trees Planted	
Banksia	6
Wattle	12
Gum	18
Bottlebrush	9

Choose and label an efficient even scale, then draw the columns.

Graph title: _____

Vertical-axis label: _____



Why is your scale efficient?

Write one comparison statement.

Building Column Graphs - Page 2

Trees Planted	
Banksia	6
Wattle	12
Gum	18
Bottlebrush	9

Choose and label an efficient even scale, then draw the columns.

Graph title: Trees Planted

Vertical-axis label: Number of trees



Why is your scale efficient?

Intervals of 3 reach every value without wasting space.

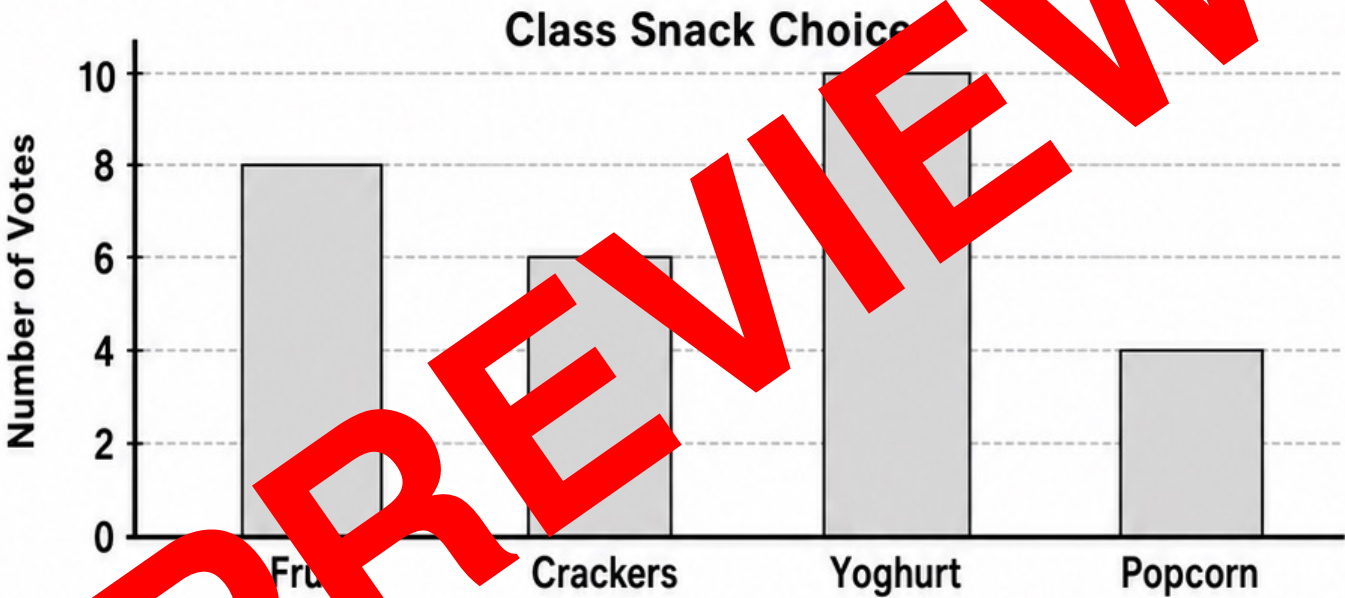
Write one comparison statement.

Gum trees were planted most, with 18 trees.

Compare the Representations - Page 1

Class Snack Choice	
Fruit	○ ○ ○ ○
Crackers	○ ○ ○
Yoghurt	○ ○ ○ ○ ○
Popcorn	○ ○

1 symbol = 2 votes



- 1 How are the graphs alike?

- 2 Which graph makes exact differences quickest to see?

- 3 Which category was most popular?

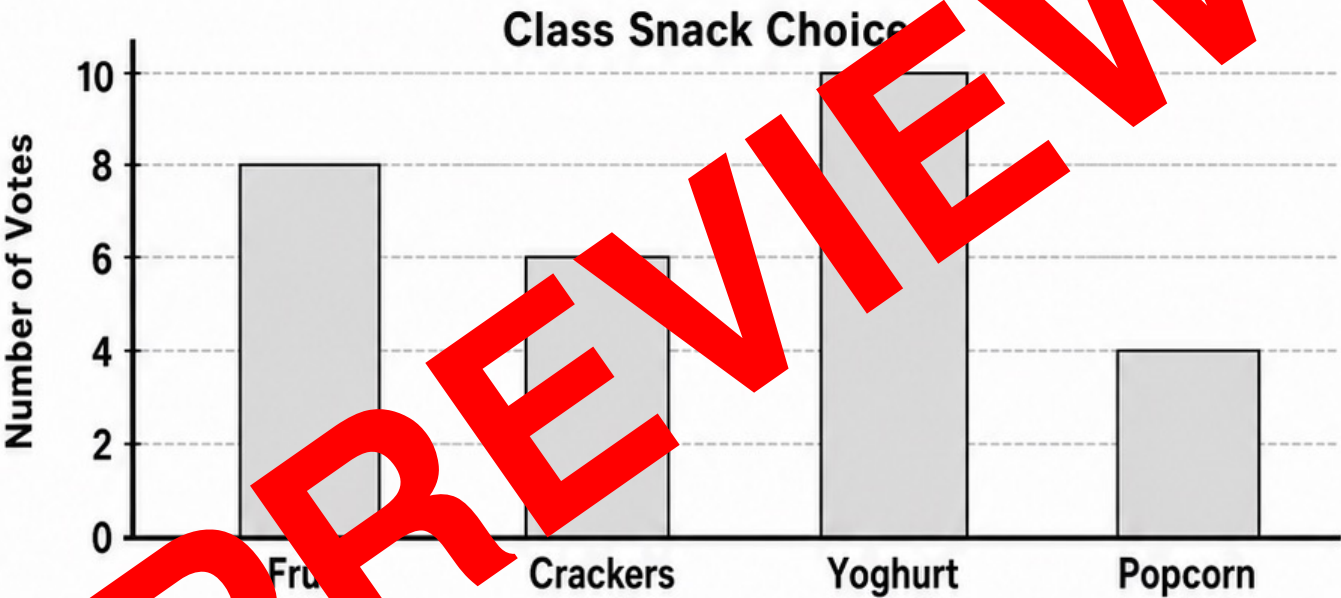
- 4 How many more votes for yoghurt than popcorn?

- 5 Which graph would you choose and why?

Compare the Representations - Page 1

Class Snack Choice	
Fruit	○ ○ ○ ○
Crackers	○ ○ ○
Yoghurt	○ ○ ○ ○ ○
Popcorn	○ ○

1 symbol = 2 votes



- 1

How are the graphs alike?
They show the same categories and frequencies.
- 2

Which graph makes exact differences quickest to see?
Column graph
- 3

Which category was most popular?
Yoghurt
- 4

How many more votes for yoghurt than popcorn?
6 votes
- 5

Which graph would you choose and why?
Example: column graph, because exact differences are quick to compare.

Name: _____

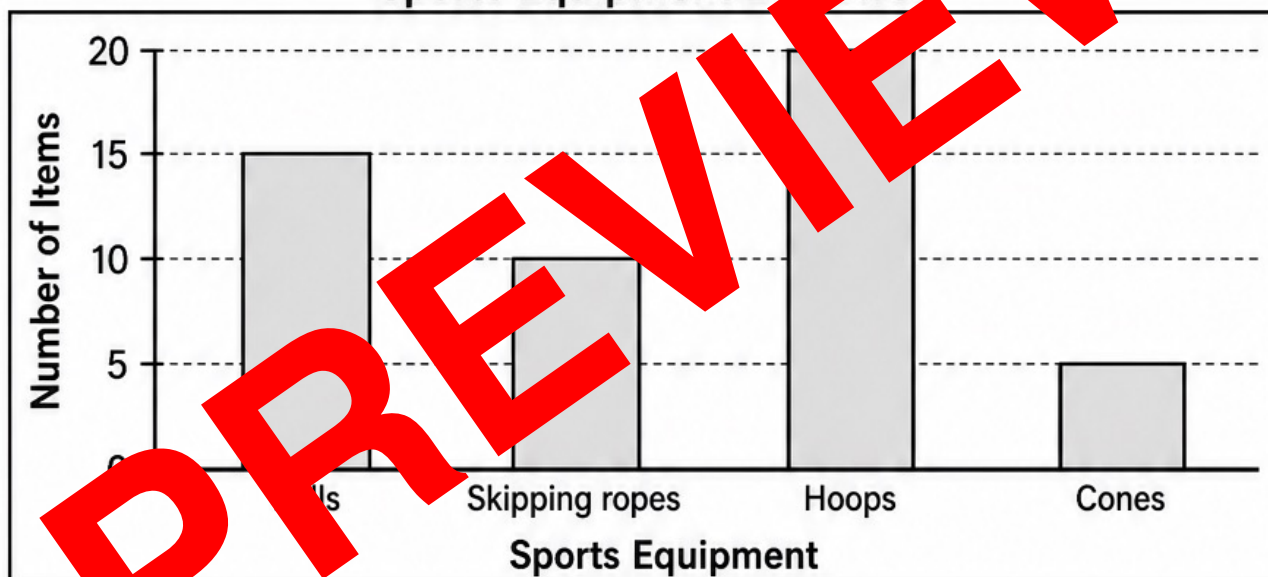
Compare the Representations - Page 2

Sports Equipment Borrowed

Balls	  
Skipping ropes	 
Hoops	   
Cones	

1 symbol = 5 items

Sports Equipment Borrowed



- 1 Which graph uses a key?

- 2 Which graph uses a numbered scale?

- 3 What is the difference between hoops and cones?

- 4 What is the total number of items?

- 5 Write one conclusion supported by both graphs.

ANSWERS

Compare the Representations - Page 2

Sports Equipment Borrowed

Balls	  
Skipping ropes	 
Hoops	   
Cones	

1 symbol = 5 items

Sports Equipment Borrowed



- 1 Which graph uses a key?

Picture graph

- 2 Which graph uses a numbered scale?

Column graph

- 3 What is the difference between hoops and cones?

15 items

- 4 What is the total number of items?

50 items

- 5 Write one conclusion supported by both graphs.

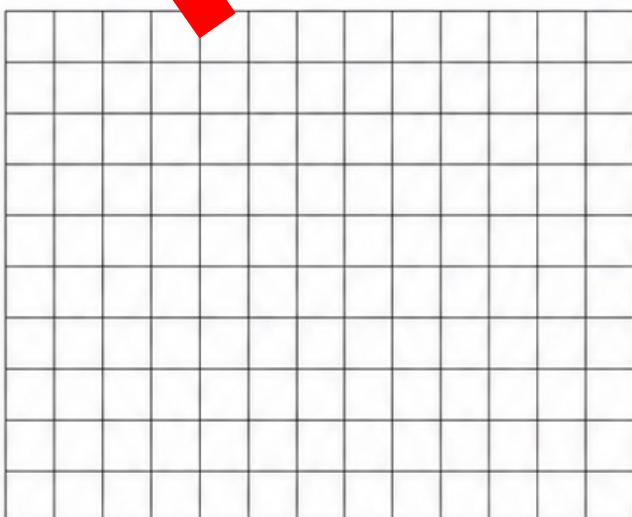
Example: Hoops were borrowed most often, with 20 items.

Name: _____

Spreadsheet Data Challenge - Page 1

Activity	Frequency
Reading	7
Drawing	5
Sport	12
Games	9
Music	3

- 1 Enter the headings and data in a spreadsheet.
- 2 Select the complete table.
- 3 Insert a column graph.
- 4 Add the title 'My Free-Time Activities'.
- 5 Label the axes Activity and Students.
- 6 Check every value and save your file.



My file name:

One statement my graph shows:

Spreadsheet Data Challenge - Page 1

Activity	Frequency
Reading	7
Drawing	5
Sport	12
Games	9
Music	3

- 1 Enter the headings and data in a spreadsheet.
- 2 Select the complete table.
- 3 Insert a column graph.
- 4 Add the title 'Favourite Free-Time Activities'.
- 5 Label the Y-axis 'Activity' and Students.
- 6 Check every value and save your file.



My file name:

favourite-free-time-data

One statement my graph shows:

Sport was most common, with 12 responses.

Name: _____

Spreadsheet Data Challenge - Page 2

	A	B
1	Transport	Total
2	Bus	6
3	Walk	9
4	Car	7
5	Bike	4

1 Which cell contains Walk?

2 Which cell contains the bike total?

3 What cell contains the four categories and totals?

4 Which cell contains the Total heading?

5 Which graph would best compare these frequencies?

6 What is the total number of responses?

Spreadsheet Data Challenge - Page 2

	A	B
1	Transport	Total
2	Bus	6
3	Walk	9
4	Car	7
5	Bike	4

1 Which cell contains Walk?

A3

2 Which cell contains the bike total?

B5

3 What name contains the four categories and totals?

A2:B5

4 Which cell contains the Total heading?

B1

5 Which graph would best compare these frequencies?

Column graph

6 What is the total number of responses?

26 responses

Name: _____

Community Garden Data Investigation - Page 1

What should the school community garden plant more of?

Tomatoes, Herbs, Strawberries, Tomatoes, Flowers, Herbs, Tomatoes, Strawberries, Herbs, Tomatoes, Strawberries, Flowers, Tomatoes, Herbs, Strawberries, Tomatoes, Herbs, Strawberries, Tomatoes, Flowers, Strawberries, Herbs, Tomatoes, Strawberries

Category	Tally	Frequency
Tomatoes		
Herbs		
Strawberries		
Flowers		

1 Which category was chosen most?

2 Which category was chosen least?

3 How many responses were collected altogether?

4 What is the difference between the most and least popular categories?

Community Garden Data Investigation - Page 1

What should the school community garden plant more of?

Tomatoes, Herbs, Strawberries, Tomatoes, Flowers, Herbs, Tomatoes, Strawberries, Herbs, Tomatoes, Strawberries, Flowers, Tomatoes, Herbs, Strawberries, Tomatoes, Herbs, Strawberries, Tomatoes, Flowers, Strawberries, Herbs, Tomatoes, Strawberries

Category	Tally	Frequency
Tomatoes		8
Herbs		6
Strawberries		7
Flowers		3

1 Which category was chosen most?

Tomatoes

2 Which category was chosen least?

Flowers

3 How many responses were collected altogether?

24 responses

4 What is the difference between the most and least popular categories?

5 responses

Name: _____

Community Garden Data Investigation - Page 2

Use your completed frequency table from Page 1.

Choose a picture graph or a column graph. Add a clear title, labels and an accurate key or even scale.



Tomatoes

Strawberries

Flowers

1 What should the garden plant more of?

2 Give one number from your graph as evidence.

3 Compare your recommendation with Flowers.

4 Name one check that proves your graph is accurate.

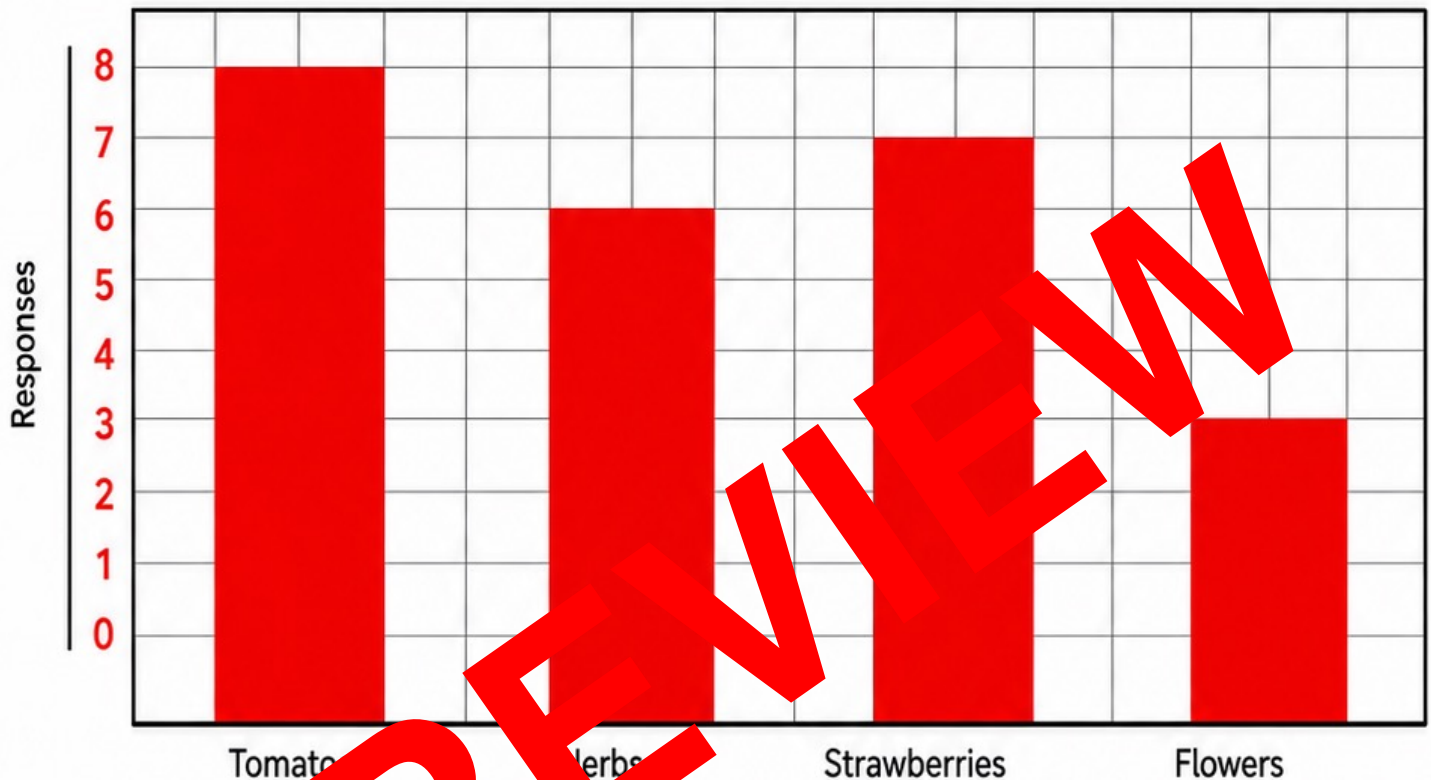
ANSWERS _____

Community Garden Data Investigation - Page 2

Use your completed frequency table from Page 1.

Choose a picture graph or a column graph. Add a clear title, labels and an accurate key or even scale.

Community Garden Choices



1 What should the garden plant more of?

Tomatoes

2 Give one number from your graph as evidence.

Tomatoes received 8 responses.

3 Compare your recommendation with Flowers.

Tomatoes received 5 more responses than Flowers.

4 Name one check that proves your graph is accurate.

The column heights match the frequency table.

Collecting and Representing Data Rubric

Student: _____ Date: _____

Criteria	BEGINNING	DEVELOPING	ACHIEVING	CONFIDENT	EXCEEDING
Recording data	Records few responses accurately.	Records some responses accurately; several errors.	Records all responses with mostly accurate tallies and totals.	Records all data accurately and checks totals.	Records, verifies and organises data independently.
Graph features	Graph is incomplete.	Includes some of the required features.	Includes title, labels and categories.	Includes all features in a clear layout.	Selects and applies features precisely for purpose.
Key or scale	Key or scale is missing or inaccurate.	Key or scale works for some values.	Uses an appropriate, mostly accurate key or scale.	Uses an efficient, even and accurate key or scale.	Justifies and checks an efficient key or scale.
Interpretation	Gives unsupported or inaccurate statements.	Identifies simple facts with limited evidence.	Gives accurate, mostly supported statements.	Compares values and supports conclusions with evidence.	Draws insightful conclusions and explains patterns.
Communication	Work is difficult to follow or incomplete.	Work is partly clear and complete.	Work is clear, complete and uses correct terms.	Work is precise, organised and easy to verify.	Communicates reasoning fluently and evaluates the graph choice.

Teacher comment:

Collecting and Representing Data



We use data to answer questions

Data is information we collect about the world around us.

A question of interest gives the investigation a purpose.

Categorical data names a group, such as a favourite fruit.

Discrete numerical data is counted, such as the number of books borrowed.



A data investigation follows six steps

1. Ask a clear question.
2. Collect accurate data.
3. Record the responses.
4. Represent the data.
5. Interpret what the graph shows.
6. Draw a conclusion supported by evidence.



A fair question has clear choices

Question: Which playground area should be provided first?

Clear choices: climbing area, ball court, quiet space or garden.

Ask every person the same question.

Record one response for each person.



Tallies keep raw responses organised

Write one tally mark for every response.

Group the fifth tally mark as the first four.

Count the tally groups carefully when the survey is finished.

Tally marks must check that no response is missed or counted twice.



A frequency table turns tallies into totals

Garden choice: Herbs 6, Tomatoes 8, Strawberries 7, Flowers 3.

The category tells us what was counted.

The frequency tells us how many responses were recorded.

Check: $6 + 8 + 7 + 3 = 24$ responses.



Picture graphs use symbols and a key

Each symbol represents a number of items.

If one book symbol represents 4 books, half a symbol represents 2 books.

Read the title, categories and key before counting symbols.

Choose a key that fits every value in the data set.



Read every part before answering

Picture graph key: one paw represents 2 pets.

Dogs: 5 paws = 10 pets.

Birds: 4 paws = 8 pets.

Cats: 3 paws = 6 pets.

Rabbits: 2 paws = 4 pets.

They change symbols into frequencies.



Column graphs compare frequencies quickly

A clear column graph needs:

- a title
- labelled horizontal and vertical axes
- categories
- a scale in equal intervals
- columns of equal width
- accurate column heights



A useful scale uses equal intervals

Data values: 6, 12, 18 and 9.

A scale of 0, 3, 6, 9, 12, 15, 18 is efficient and even.

Unequal gaps in the scale can make a graph misleading.

The top of each column must match its exact value.



One table can become different graphs

Snack choices: Fruit 8, Crackers 6, 5, 4, 3, 2, 1, 0, 1, 2, 3, 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.

A picture graph can make the data visually memorable.

A column graph can make exact comparisons quick.

Both graphs must show the same frequencies.



Choose the clearest representation

Use a picture graph when a symbol can make data easy to scan.

Use a column graph when exact values and differences are important.

Use a table when readers need the original totals.

Best choice depends on the audience and purpose.



Interpret most, least and difference

Rainy-day reading minutes

Monday 12, Tuesday 18, Wednesday 10, Thursday 20, Friday 16.

on Thursday, 20 minutes.

Least: Wednesday, 10 minutes.

Difference: $20 - 10 = 10$ minutes.



Totals and combined categories and meaning

To find a total, add every frequency.

To compare two categories, subtract the smaller value from the larger value.

To combine categories, add only the named frequencies.

Answers include the unit in the answer.



Support every statement with evidence

Weak statement: Tomatoes were popular.

Strong statement: Tomatoes were the most popular choice with 8 responses, which was 5 more than flowers.

Name, category, value and comparison shown by the data.



Check a graph before trusting it

As

- Does the graph have a clear title?
- Are the axes and categories labelled?
- Are the scale intervals equal?
- Do the bar heights match the data?
- Does the picture-graph key work for every symbol?



Spreadsheets make neat digital graphs

1. Enter category headings and frequencies.
2. Select the complete data table.
3. Insert a column graph.
4. Add a clear title and axis labels.
5. Check the scale and every value.
6. Save the file with a useful name.



Guided investigation: travel to school

Question: How do students in our class usually travel to school?

Possible categories: walk, bike, scooter, car and bus.

Collect the response from each student.

Create a table and a graph and write two evidence-based statements.

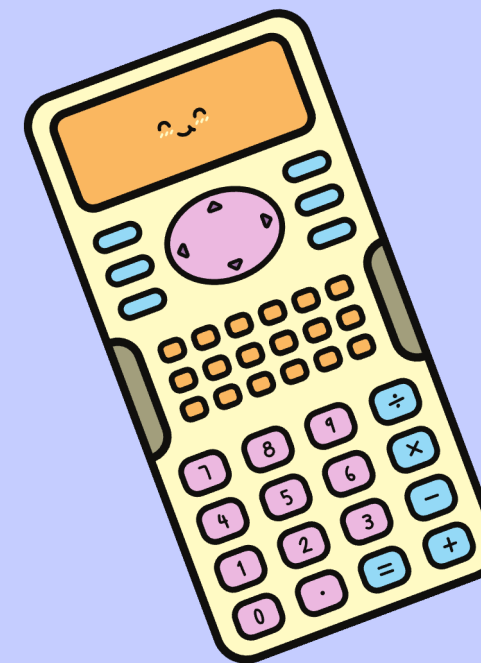
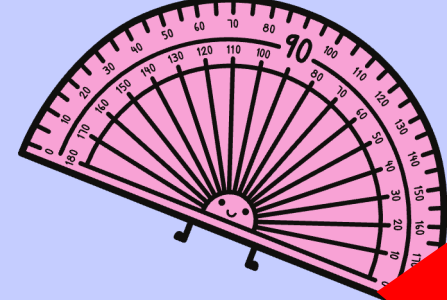
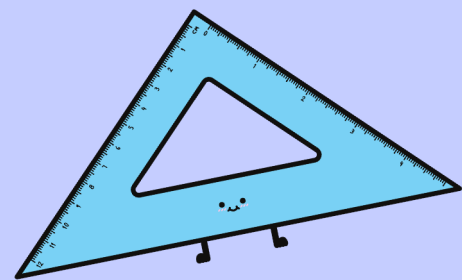
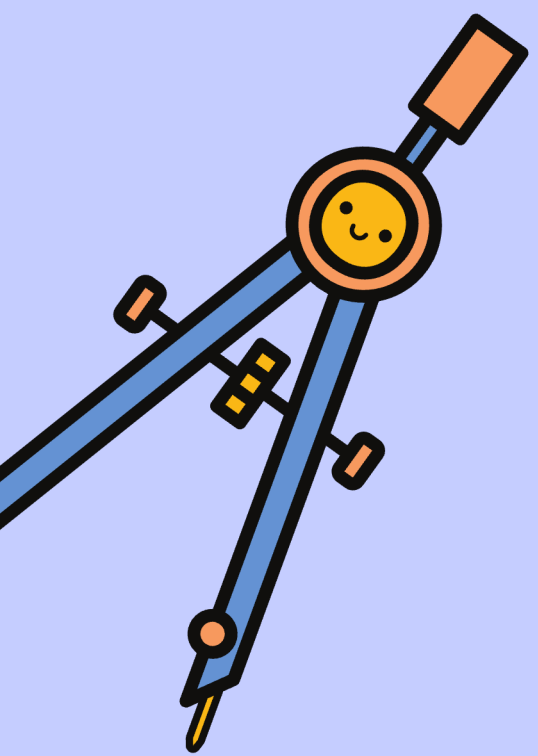


Review the full investigation

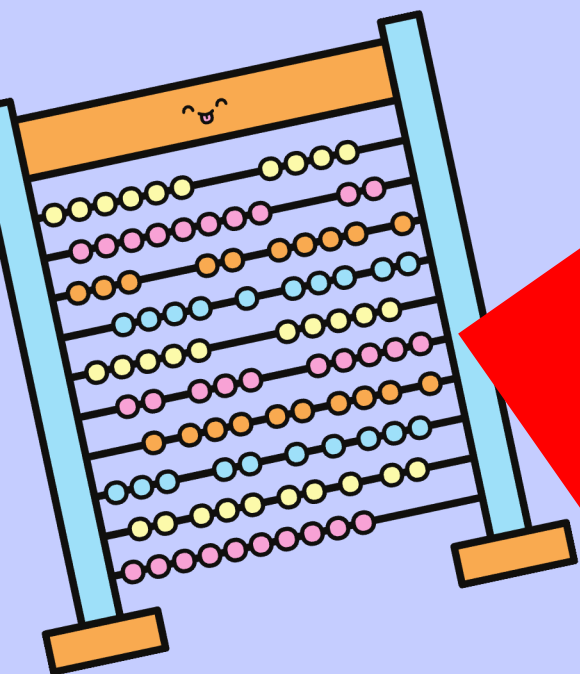
Can you:

- ask a clear question?
- record responses with tables and totals?
- create a picture graph or column graph?
- use an appropriate key or scale?
- compare two representations?
- support a conclusion with data?

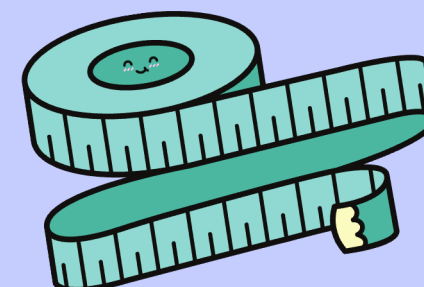
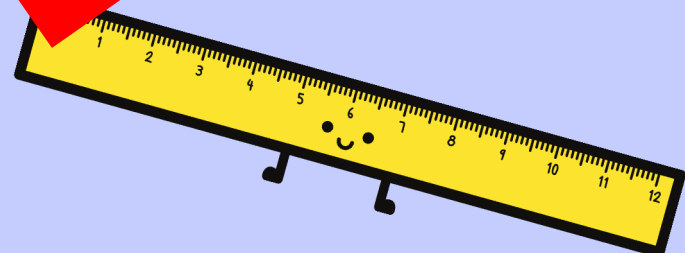




Well Done!



PREF



Collecting and Representing Data Quiz



Question 1

Which feature tells what each picture caption and number represents?

- A. The title
- B. The key
- C. The border
- D. The column width



Answer 1

B. The key tells what each symbol represents.



Question 2

True or false?

If one star represents 4 votes, half a star represents 2 votes.



Answer 2

True Half of is 2.



Question 3

A column graph shows Monday 7 books, Tuesday 9 books and Wednesday 4 books.

How many more books were read on Tuesday than Wednesday?



Answer 3

Book Calculator $9 - 4 = 5$.



Question 11

Which representation is usually best for comparing exact frequencies across several categories?

A. A column graph

B. A story

C. A map

D. A number line



Answer 4

A. A column graph makes exact category comparisons clear.



Question 5

True or false?

A column-graph should use uneven intervals if the columns look tidy.



Answer 5

False. Scale intervals must be equal so the graph is accurate.



Question 6

Survey results are: Wheel 8, Car 11, Bus 5 and Bike 6.

What is the total number of responses?



Answer 6

30 responses. Calculate $11 + 5 + 6 = 30$.



Question 7

What should happen first in a data investigation?

- A. Colour the graph
- B. Write a conclusion
- C. Ask a clear question
- D. Choose the tallest column



Answer 7

C. Start by asking a clear question of interest.



Question 8

True or false?

The height of a column could match the category's frequency on the y-axis scale.



Answer 8

True. The column height must show the exact frequency.



Question a

Data shows Herbs 6, Tomatoes 8, Strawberries 7 and Flowers 3.

Which statement is supported by the data.



Answer d

Example: Tomatoes were the most popular choice with 8 responses.

Other accurate evidence-based statements are acceptable.



Question 10

Which spreadsheet selection contains every category and frequency?

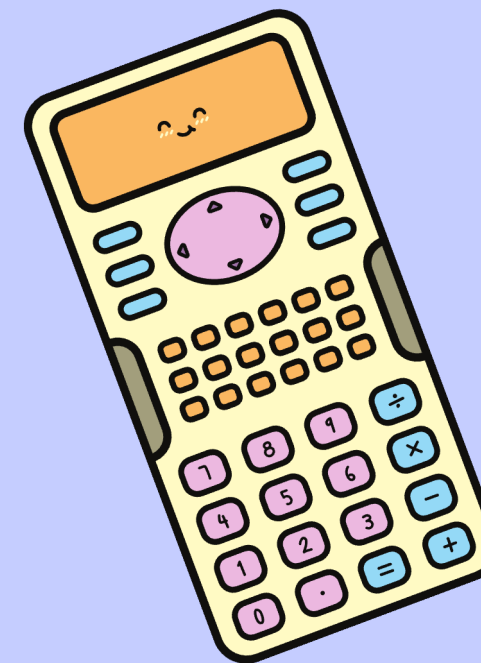
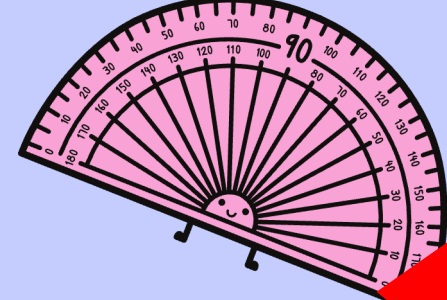
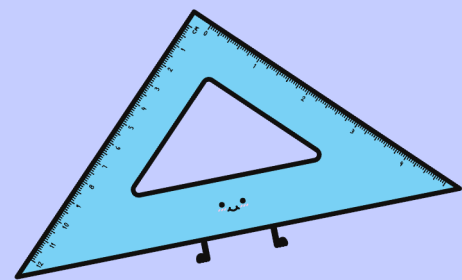
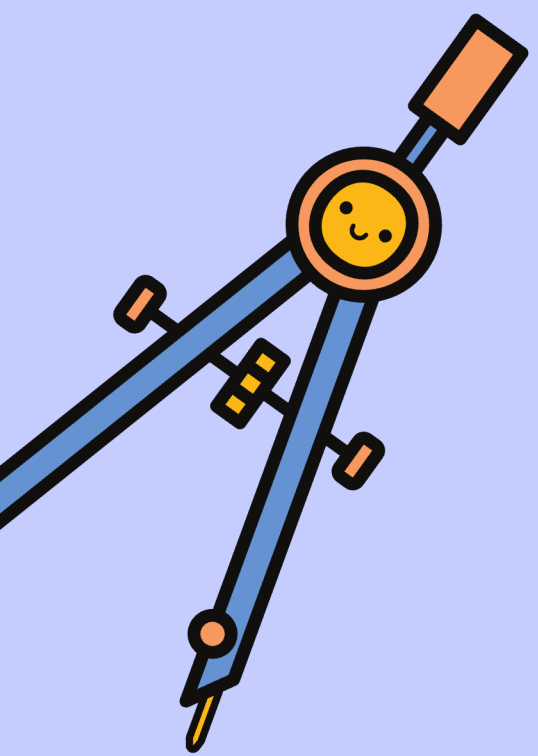
- A. Only the first cell
- B. Only the largest number
- C. The complete two-column data table
- D. One empty row



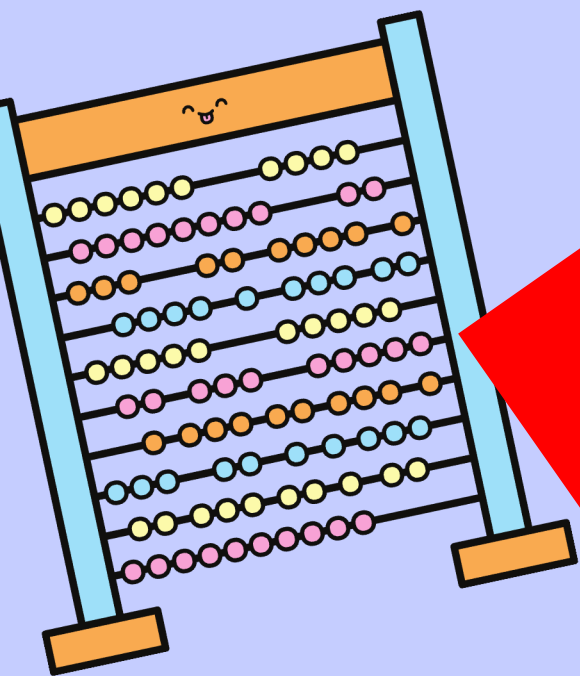
Answer 10

C. Select the complete two-column data table before inserting the graph.





Well Done!



PREVIEW

