

PRINTABLE MATHS WORKSHEET PACK

DATA HANDLING & GRAPHS

Collect • Organise • Represent • Analyse

DATA SKILLS	GRAPH SKILLS	STATISTICS
Collect & classify data	Pictographs	Mean • Median
Tally & frequency tables	Bar & double-bar graphs	Mode • Range
Questionnaires & surveys	Line graphs	Compare & interpret
Samples & bias	Pie charts	Real-life problem solving

Suggested age: 10–14 years | **Grades:** 5–8

Includes: printable activities, graph-reading tasks, data tables, interpretation questions, problem solving, challenge activities and answer key.

Ideal for classroom practice, revision, maths centres, homework, assessment preparation and independent learning.

TEACHER / PARENT GUIDE

A structured progression from collecting data to analysing and communicating information.

Key topics covered

TOPIC	WHAT STUDENTS PRACTISE
Data collection	Questions, surveys, categories, primary data and fair sampling
Tally & frequency	Tally marks, frequency tables, totals and comparisons
Data representation	Pictographs, bar graphs, double-bar graphs, line graphs and pie charts
Statistics	Mean, median, mode and range
Interpretation	Reading trends, comparing categories and identifying conclusions
Critical thinking	Choosing suitable graphs, spotting misleading displays and evaluating data

International-friendly: The pack uses widely recognised mathematical language and metric contexts, with examples that can be used across different curricula.

1 • COLLECTING & CLASSIFYING DATA

Learn how data is gathered, organised and grouped.

A. Data detective

A class wants to find out how students travel to school. Choose the most useful question and explain why it is fair and clear.

QUESTION	CLEAR / UNCLEAR?	WHY?
How do you usually travel to school?	_____	_____
Do you like school?	_____	_____
How long is your journey to school?	_____	_____

B. Classify the data

For each item, decide whether it is **categorical** or **numerical** data.

ITEM	TYPE
Favourite sport	_____
Number of siblings	_____
Eye colour	_____
Height in cm	_____
Favourite school subject	_____

C. Fair or biased?

A student surveys only members of the football team to find the whole school's favourite sport. Is this likely to give a fair result? Explain.

2 • TALLY CHARTS & FREQUENCY TABLES

Turn raw data into an organised frequency table.

The following are the numbers of books read by 20 students in one month:

2, 4, 3, 5, 2, 6, 4, 3, 2, 5, 4, 1, 3, 4, 6, 2, 5, 3, 4, 2

BOOKS	TALLY	FREQUENCY
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
TOTAL		_____

Answer these questions:

1. Which number of books was most common? _____
2. How many students read at least 4 books? _____
3. How many students were surveyed? _____
4. What fraction of the students read exactly 2 books? _____

3 • PICTOGRAPHS

Represent frequency using symbols and interpret the key.

A library recorded the number of new books borrowed from four sections in one week.

Key: ■ = 4 books

SECTION	BOOK SYMBOLS
Adventure	■ ■ ■ ■
Science	■ ■ ■
History	■ ■
Art	■ ■ ■ ■ ■

1. How many Adventure books were borrowed? _____
2. How many books were borrowed from Art? _____
3. Which section had the fewest books? _____
4. How many books were borrowed altogether? _____
5. If the library wanted 30 more Science books borrowed, how many more symbols would that represent? _____

Create your own pictograph

Use the data: Cats = 12, Dogs = 8, Fish = 4, Birds = 16. Choose a suitable key and draw the pictograph.

4 • BAR GRAPHS

Read, construct and interpret bar graphs.

The table shows the number of points scored by five teams.

TEAM	POINTS
A	18
B	12
C	25
D	20
E	15

Draw a bar graph using the data above. Use a clear title, labelled axes and an even scale.

Interpret your graph:

1. Which team scored the most? _____
2. Which scored the least? _____
3. What is the difference between Team C and Team B? _____
4. How many points were scored by Teams A and D together? _____

5 • DOUBLE-BAR GRAPHS

Compare two related data sets.

A class recorded the number of fiction and non-fiction books read by students in four months.

MONTH	FICTION	NON-FICTION
January	18	12
February	22	15
March	16	20
April	25	18

Draw a double-bar graph for the data. Include a key showing which bar represents each category.

1. In which month were non-fiction books higher than fiction books? _____
2. What was the total number of books read in April? _____
3. In which month was the difference between the two categories greatest? _____

6 • LINE GRAPHS & TRENDS

Use line graphs to show change over time.

The temperature at a weather station was recorded at 2-hour intervals.

TIME	8 am	10 am	12 pm	2 pm	4 pm	6 pm
TEMPERATURE (°C)	12	15	19	22	20	17

Plot the points and join them to make a line graph. Label both axes and add a title.

1. At what time was the temperature highest? _____
2. How much did the temperature rise between 8 am and 2 pm? _____
3. Describe the trend from 2 pm to 6 pm. _____

7 • PIE CHARTS

Understand parts of a whole and connect fractions, percentages and angles.

A survey of 120 students asked about their favourite after-school activity.

ACTIVITY	STUDENTS
Sport	48
Reading	24
Music	18
Art	12
Other	18

A. Find the percentage of students in each category.

ACTIVITY	PERCENTAGE
Sport	_____ %
Reading	_____ %
Music	_____ %
Art	_____ %
Other	_____ %

B. Find the central angle for each category using: $\text{angle} = \text{percentage} \times 360^\circ$.

ACTIVITY	ANGLE
Sport	_____ °
Reading	_____ °
Music	_____ °
Art	_____ °
Other	_____ °

8 • MEAN, MEDIAN, MODE & RANGE

Calculate and interpret the four key measures of a data set.

For the data set 4, 7, 7, 9, 10, 11, 12:

1. Mean = _____ 2. Median = _____ 3. Mode = _____ 4. Range = _____

Challenge 2

The scores in a quiz were: 6, 8, 9, 9, 10, 12, 14, 16.

1. Find the mean. _____ 2. Find the median. _____

3. Find the mode. _____ 4. Find the range. _____

Challenge 3 • Which measure?

A. A data set contains one unusually large value. Which measure is usually less affected: mean or median? _____

B. Which measure tells you the most common value? _____

C. Which measure tells you the difference between the largest and smallest values? _____

9 • READING & INTERPRETING DATA

Look beyond the numbers: compare, explain and make evidence-based conclusions.

A school surveyed 200 students about their preferred school lunch.

LUNCH	STUDENTS
Sandwich	70
Pasta	50
Rice bowl	40
Salad	20
Other	20

1. What percentage chose Sandwich? _____
2. How many more students chose Sandwich than Salad? _____
3. Which two categories together make 30% of the responses? _____
4. A student says, "Most students chose Pasta." Is this supported by the data? Explain.

5. Write one sensible conclusion from the survey.

Think like a data scientist

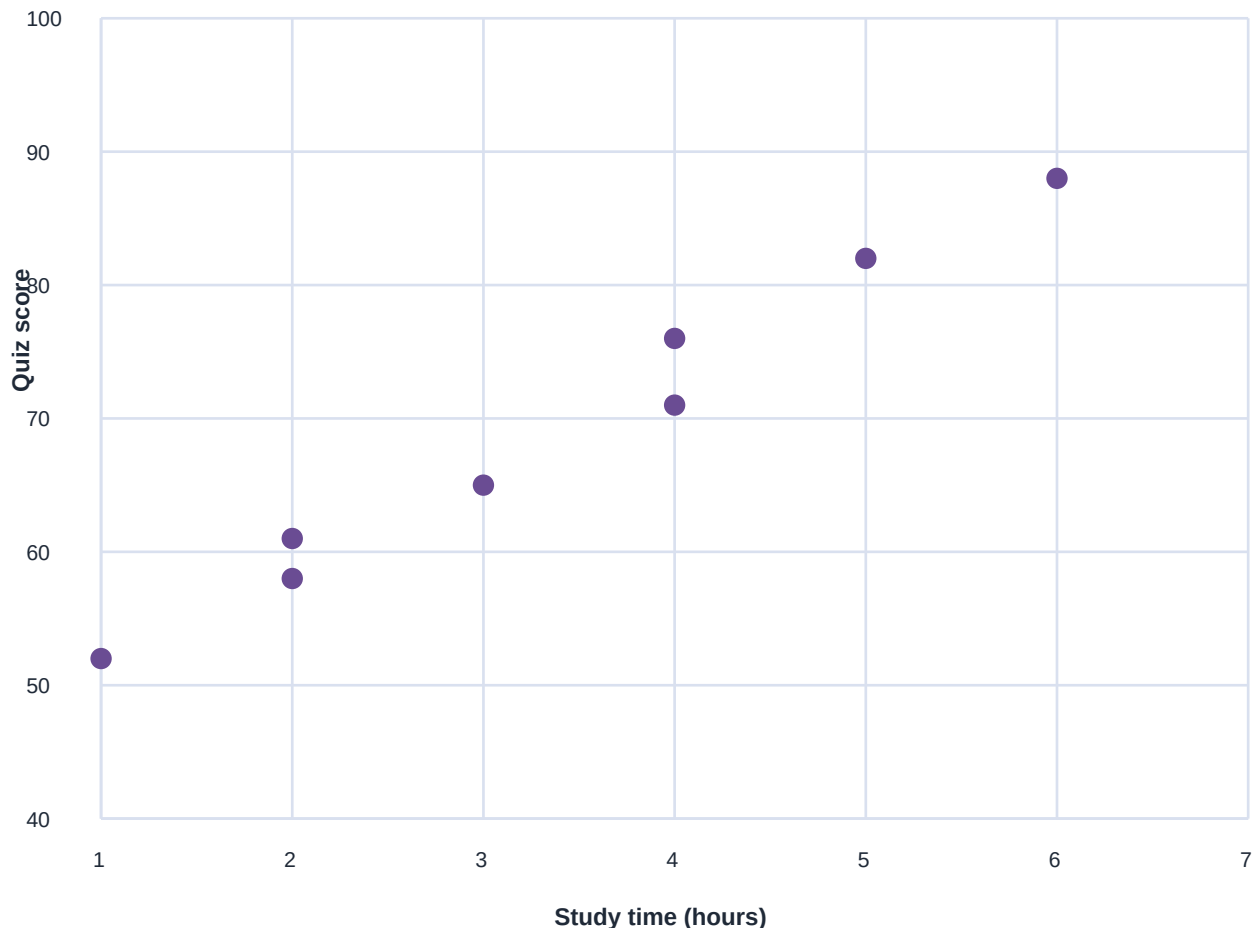
Why is it important to know how many people were surveyed before drawing conclusions from a percentage?

12 • SCATTER PLOTS & RELATIONSHIPS

Scatter plots help us explore whether two numerical variables appear to be related.

A. Plot the data

The table shows study time and quiz score for 8 students. Plot each pair as a point.



B. Interpret

1. Does the graph suggest a positive, negative or no relationship? _____
2. What happens to quiz scores as study time generally increases? _____
3. Does a scatter plot prove that one variable causes the other? Explain. _____
4. Identify one pair that does not fit the overall pattern particularly well. _____

13 • DATA & PROBABILITY CHALLENGE

Use fractions or percentages where appropriate. Give reasons for your answers.

A. Spinner data

A spinner has 8 equal sections: 3 blue, 2 green, 2 yellow and 1 red.

1. $P(\text{blue}) =$ _____
2. $P(\text{red}) =$ _____
3. $P(\text{not green}) =$ _____
4. Which colour is most likely? _____
5. Which is least likely? _____

B. Experimental data

A student spins the spinner 80 times and records: blue 29, green 21, yellow 19, red 11.

1. Find the experimental probability of landing on blue. _____
2. Compare the experimental result with the theoretical probability. _____
3. Give one reason the experimental results may not exactly match the theoretical probabilities.

C. Data investigation

Design a fair question for a class survey. State your population, sample and the type of graph you would use to display the results.

**Remember: theoretical probability describes what should happen;
experimental probability describes what happened in an actual trial.**

10 • GRAPH CHOICE & CRITICAL THINKING

Choose the right display and spot ways graphs can mislead.

A. Which graph?

SITUATION	BEST GRAPH
Temperature changing through a day	_____
Favourite sports in a class	_____
Comparing boys' and girls' choices across subjects	_____
Parts of a whole budget	_____

B. Spot the problem

A bar graph comparing 40 students and 50 students starts its vertical axis at 35 instead of 0. Could this make the difference look larger than it really is? Explain.

C. True or false?

STATEMENT	TRUE / FALSE
A line graph is useful for showing change over time.	_____
A pie chart should show parts of one whole.	_____
A frequency table can help you build a bar graph.	_____
The mode is always the largest number in a data set.	_____

11 • DATA HANDLING MASTER CHALLENGE

Put your skills together in a real-life investigation.

A school garden recorded the number of visitors during one week:

DAY	MON	TUE	WED	THU	FRI
VISITORS	24	31	28	37	40

1. What was the total number of visitors? _____
2. What was the mean number of visitors per day? _____
3. What was the range? _____
4. On which day were there 25% more visitors than Monday? _____
5. Draw a suitable graph for the data and explain why you chose it.

6. Write one question that could be answered using your graph.

ANSWER KEY

Teacher / parent reference.

1. Collecting & classifying

A. Best survey question: "How do you usually travel to school?" It is specific and measurable. B. Categorical: favourite sport, eye colour, favourite school subject. Numerical: number of siblings, height. C. Biased sample because the football team is not representative of the whole school.

2. Tally & frequency

BOOKS	FREQUENCY
1	1
2	5
3	4
4	5
5	3
6	2
TOTAL	20

Most common: 2 and 4 (tie). At least 4 books: 10 students. Survey size: 20. Fraction reading exactly 2 books: $5/20 = 1/4$.

3. Pictograph: Adventure = 16, Science = 12, History = 8, Art = 20; total = 56. For 30 more Science books, 7.5 symbols would be needed, so a better key or partial-symbol convention is needed; this is an intentional design/representation discussion.

4. Bar graph: highest C (25), lowest B (12), difference $C-B = 13$, $A+D = 38$.

5. Double-bar: January difference 6, February 7, March 4 (non-fiction higher), April 7. April total = 43. Greatest difference: February and April (tie).

ANSWER KEY • CONTINUED

Graphing, statistics and interpretation.

6. Line graph

Highest temperature: 2 pm (22°C). Rise from 8 am to 2 pm: 10°C. From 2 pm to 6 pm, temperature falls from 22°C to 17°C.

7. Pie chart

ACTIVITY	%	ANGLE
Sport	40%	144°
Reading	20%	72°
Music	15%	54°
Art	10%	36°
Other	15%	54°

8. Mean, median, mode, range: For 4,7,7,9,10,11,12 → mean = $60/7 \approx 8.57$, median = 9, mode = 7, range = 8. For 6,8,9,9,10,12,14,16 → mean = $84/8 = 10.5$, median = $(9+10)/2 = 9.5$, mode = 9, range = 10. Challenge 3: median; mode; range.

9. Lunch survey: Sandwich = 35%. Sandwich – Salad = 50 students. 30% = Rice bowl + Other ($40 + 20 = 60$). “Most chose Pasta” is not supported; Sandwich is the largest category. Any conclusion should be based on the data. Sample size matters because percentages from very small samples can be less reliable/generalizable.

10. Graph choice: temperature over time → line graph; favourite sports → bar graph; boys vs girls across subjects → double-bar graph; parts of a whole budget → pie chart. A truncated bar axis can exaggerate visual differences. True, true, true, false.

11. Master challenge: total = 160 visitors; mean = 32; range = 16; Thursday has 25% more visitors than Monday ($24 \times 1.25 = 30$, so actually **no day** has exactly 25% more than Monday; Tuesday is about 29.2% more and Thursday 54.2% more). Suitable graph: line graph or bar graph, with justification. Q6: answers vary.

Marketplace positioning: A comprehensive, print-and-go Data Handling & Graphs resource combining data collection, tables, graphing, statistics, interpretation and critical thinking for upper-primary/lower-secondary learners.