

WA6MPSS3

Statistics

Core + Challenge

Statistical Investigations — Marking Key

I can plan an investigation, collect and graph data, and explain what it shows.

For tutors and parents. Award method marks for correct working even if the final answer is wrong.

Marks summary

A Warm up: 16 B Practise: 23 C Think it through: 10 D Challenge: 9 **Total: 58**

Gold shading in this key shows what the child should have shaded or drawn. Accept any correct arrangement unless the question fixes it.

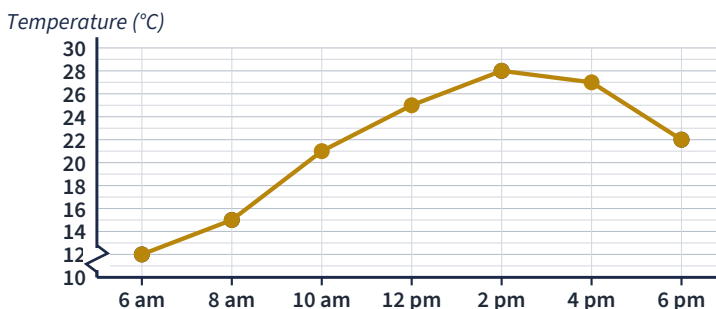
A

Warm up *answers*

/ 16 marks

Q	Answer	Model answer / notes	Marks
1	Discrete	Goals are counted: 0, 1, 2, ...	1
2	Continuous	Time is measured and can be any value, e.g. 15.37 s.	1
3	Continuous	Height is measured.	1
4	Discrete	People are counted.	1
5	Survey	Ask the students.	1
6	Observe	Watch and count. Accept “observe” or “count”.	1
7	Measure	Use scales.	1
8	Measure	Use a thermometer.	1
9	7	 7 tally marks: 1 group of five (5) and 2 more.	1
10	9	 9 tally marks: 1 group of five (5) and 4 more.	1
11	5	 5 tally marks: 1 group of five (5).	1
12	3	 3 tally marks: 3 single marks.	1

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Q	Answer	Model answer / notes	Marks
13	Point at (10 am, 21)	 See the gold points. Accept $\pm 1^\circ\text{C}$.	1
14	Point at (12 pm, 25)	Accept $\pm 1^\circ\text{C}$.	1
15	Point at (4 pm, 27)	Accept $\pm 1^\circ\text{C}$.	1
16	8 am to 10 am	Rises: 3, 6, 4, 3 $^\circ\text{C}$. The biggest (6 $^\circ\text{C}$) is 8 am to 10 am.	1

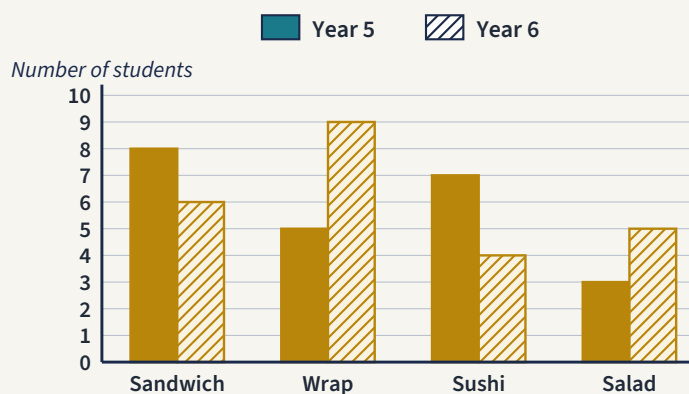
B

Practise *answers and working*

/ 23 marks

Q	Answer	Working / sample response	Marks
1	b) Continuous	a) e.g. "How many hours did you sleep on Friday night, and on Tuesday night?" (asks about both kinds of night, with a clear unit). b) Continuous: sleep time is measured and can be any value (e.g. 9.5 hours). <i>1 mark: a clear question that compares weekend and school nights.</i> <i>1 mark: continuous, with a reason.</i>	2

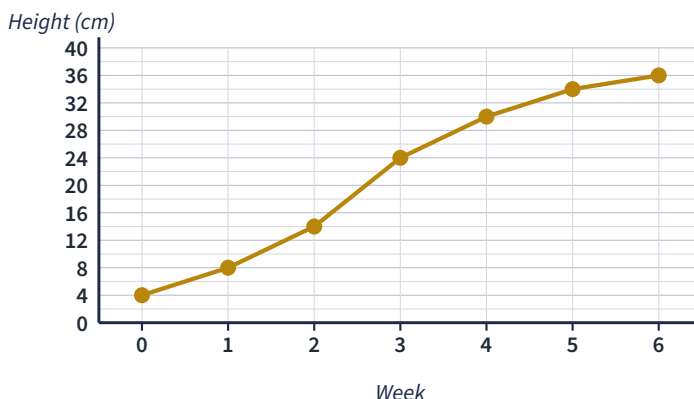
2 Wrap and salad



Columns: Sandwich 8 and 6, Wrap 5 and 9, Sushi 7 and 4, Salad 3 and 5.
Year 6 is higher for wrap (9 v 5) and salad (5 v 3).

2 marks: all eight columns correct and side by side (1 mark for six or seven).
1 mark: wrap and salad.

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Q	Answer	Working / sample response	Marks
3	b) Week 2 to 3 (10 cm) c) about 27 cm	 a) Points (0, 4), (1, 8), (2, 14), (3, 24), (4, 30), (5, 34), (6, 36), joined. b) Growth: 4, 6, 10, 6, 4, 2 cm. The most was from week 2 to week 3 (10 cm). c) Halfway between 24 and 30: about 27 cm (accept 26 to 28). <i>1 mark: points plotted and joined.</i> <i>1 mark: between week 2 and week 3 (accept "week 3").</i> <i>1 mark: 26 to 28 cm.</i>	3
4	e.g. tape not straight; rounding	a) e.g. the tape was not kept straight or tight; they started from different places; they rounded differently; reading errors. b) Measure carefully several times with the same method, and use the value that comes up most often (or the middle value). <i>1 mark: two sensible reasons.</i> <i>1 mark: a sensible way to improve (repeat, same method, careful reading).</i>	2
5	a) June b) 2024 (480 v 470)	a) Differences: Jun 30, Jul 10, Aug 20, Sep 10 mm. June is biggest. b) 2024: $130 + 150 + 120 + 80 = 480$ mm. 2025: $160 + 140 + 100 + 70 = 470$ mm. 2024 was wetter. c) Weather patterns change each year (e.g. more or fewer cold fronts, El Niño or La Niña). <i>1 mark: June.</i> <i>1 mark: 480 and 470, so 2024.</i> <i>1 mark: a sensible reason for natural variation.</i>	3
6	C	C gives a fair sample from every year group and is big enough. A is too small; B and D are biased (they only show one group). <i>1 mark: C.</i> <i>1 mark: explains why the others are unfair or too small.</i>	2
7	a) Wednesday (48 °C)	a) Wednesday: 48 °C is much higher than all the others (30 to 34 °C). b) e.g. the thermometer was in direct sun, or he misread or miswrote it (38?). c) Check it: measure again in the shade, at the same time and place every day. <i>1 mark: Wednesday.</i> <i>1 mark: a sensible cause and what to do.</i>	2

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Q	Answer	Working / sample response	Marks																
8	See table	<table border="1"> <thead> <tr> <th>Q</th><th>Type</th><th>Collect</th><th>Graph</th></tr> </thead> <tbody> <tr> <td>1</td><td>continuous</td><td>measure</td><td>line graph</td></tr> <tr> <td>2</td><td>discrete</td><td>survey</td><td>side-by-side column</td></tr> <tr> <td>3</td><td>continuous</td><td>measure weekly</td><td>line graph</td></tr> </tbody> </table>	Q	Type	Collect	Graph	1	continuous	measure	line graph	2	discrete	survey	side-by-side column	3	continuous	measure weekly	line graph	3
Q	Type	Collect	Graph																
1	continuous	measure	line graph																
2	discrete	survey	side-by-side column																
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1: continuous; line graph.

2: survey; side-by-side column graph.

3: continuous; measure each week.

1 mark for each row completed correctly.

9

b) 4 c) 5

People	Tally	Frequency
2		3
3		6
4		9
5		4
6		2
7		1

3

a) 2: 3, 3: 6, 4: 9, 5: 4, 6: 2, 7: 1 (total 25).

b) 4 people (9 students).

c) $7 - 2 = 5$.

1 mark: tally table (allow one slip).

1 mark: 4.

1 mark: 5.

C

Think it through *sample answers and criteria*

/ 10 marks

Q	Answer	Working / sample response	Marks
1	No: use a column graph	Favourite fruits are categories, not a measurement that changes over time. A line joining apple to banana means nothing; a column graph is better. 1 mark: disagrees. 1 mark: line graphs are for change over time; use a column graph for categories.	2
2	False	People change their minds, different people may be absent, and moods or weather differ. So the results vary, even with the same question. 1 mark: False. 1 mark: a reason the results vary.	2
3	Sometimes	Sometimes they agree (e.g. counting or a clear ruler reading). Often they differ a little because of rounding, tools or reading the scale (like the classroom lengths). 1 mark: Sometimes. 1 mark: an example or reason for each.	2

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Q	Answer	Working / sample response	Marks
4	Number of brothers and sisters	Time, height and temperature are measured: continuous data. The number of brothers and sisters is counted: discrete data. <i>1 mark: number of brothers and sisters.</i> <i>1 mark: discrete (counted) v continuous (measured). Accept another choice with a correct reason.</i>	2
5	Rain changes travel	On a rainy day more students are driven, so car is higher than usual. Better: ask on several different days (rainy and dry), or ask about a whole week. <i>1 mark: explains the rainy day affects the results.</i> <i>1 mark: a sensible improvement (more days, whole week).</i>	2

D

Challenge solutions and criteria

/ 9 marks

Q	Answer	Working / sample response	Marks												
1	a) Y6: 15, 10 Y4: 22, 14 b) Year 6 c) 15 or 31	a) Year 6: mode 15 cm, range $20 - 10 = 10$ cm. Year 4: mode 22 cm, range $30 - 16 = 14$ cm. b) Year 6: its distances are lower (mode 15 v 22) and closer together (range 10 v 14). c) The range must grow from 14 to 15, so the lost result is a new lowest ($30 - 15 = 15$) or a new highest ($16 + 15 = 31$). Neither changes the mode (22 appears 3 times). <i>1 mark: all four values.</i> <i>1 mark: Year 6, with data.</i> <i>1 mark: 15 and 31 (both, no others).</i>	3												
2	b) 15.0 to 15.9 c) 3.8 s	<table border="1"><thead><tr><th>Time (s)</th><th>Students</th></tr></thead><tbody><tr><td>14.0 to 14.9</td><td>3</td></tr><tr><td>15.0 to 15.9</td><td>4</td></tr><tr><td>16.0 to 16.9</td><td>3</td></tr><tr><td>17.0 to 17.9</td><td>1</td></tr><tr><td>18.0 to 18.9</td><td>1</td></tr></tbody></table> a) 3, 4, 3, 1, 1 (total 12). b) Every time is different, so no single time is the mode. The modal group is 15.0 to 15.9 s (4 students). c) $18.0 - 14.2 = 3.8$ s. <i>1 mark: table correct.</i> <i>1 mark: explains all times are different and names 15.0 to 15.9.</i> <i>1 mark: 3.8 s.</i>	Time (s)	Students	14.0 to 14.9	3	15.0 to 15.9	4	16.0 to 16.9	3	17.0 to 17.9	1	18.0 to 18.9	1	3
Time (s)	Students														
14.0 to 14.9	3														
15.0 to 15.9	4														
16.0 to 16.9	3														
17.0 to 17.9	1														
18.0 to 18.9	1														

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Q	Answer	Working / sample response	Marks																		
3	b) 10 cm	—●— Sun —■— Shade Height (cm) <table><tr><th>Week</th><th>Sun (cm)</th><th>Shade (cm)</th></tr><tr><td>0</td><td>2</td><td>2</td></tr><tr><td>1</td><td>5</td><td>3</td></tr><tr><td>2</td><td>9</td><td>5</td></tr><tr><td>3</td><td>14</td><td>7</td></tr><tr><td>4</td><td>18</td><td>8</td></tr></table> Week a) Sun: 2, 5, 9, 14, 18. Shade: 2, 3, 5, 7, 8. b) $18 - 8 = 10$ cm. c) e.g. different water, soil or seeds; only one plant of each; measuring errors. <i>1 mark: both lines plotted with the key.</i> <i>1 mark: 10 cm.</i> <i>1 mark: a sensible reason.</i>	Week	Sun (cm)	Shade (cm)	0	2	2	1	5	3	2	9	5	3	14	7	4	18	8	3
Week	Sun (cm)	Shade (cm)																			
0	2	2																			
1	5	3																			
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