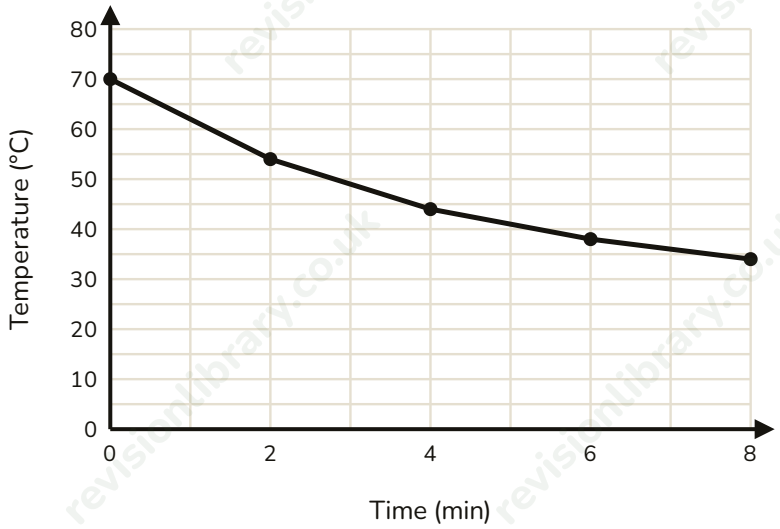
4.2 Working Scientifically: Data, Graphs and Evaluation: 10-minute Pack

Calculator allowed · about 10 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The graph shows another display of the same cooling results. Describe how the temperature changes and use the first and last two-minute intervals to decide whether cooling is getting faster or slower.



(3)

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2 A ball is dropped from the same height four times. Bounce heights are 42 cm, 43 cm, 69 cm and 41 cm. Identify a possible anomaly, calculate the mean of ALL four results to one decimal place, and explain how to investigate the unusual result before deciding what to report.

(5)

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3 A ruler has millimetre divisions. A leaf tip lines up exactly with the 12.4 cm mark when its base is at zero. Choose the best record: 12 cm, 12.4 cm or 12.400 cm. Explain your choice.

(2)

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Mark scheme · 4.2 Working Scientifically: Data, Graphs and Evaluation: 10-minute Pack

Question 1

Temperature decreases throughout the measured time.	**B1**
First fall = 70 - 54 = 16 °C; last fall = 38 - 34 = 4 °C.	**A1**
Smaller fall in the same time shows slower cooling later.	**B1**

Answer: **Temperature falls, with slower cooling later. It falls 16 °C from 0 to 2 min but only 4 °C from 6 to 8 min.**

Question 2

Identifies 69 cm as a possible anomaly because the other readings cluster at 41 to 43 cm.	**B1**
(42 + 43 + 69 + 41) / 4 = 195/4.	**M1**
48.8 cm to one decimal place (48.75 unrounded).	**A1**
Checks records/method or repeats under the same conditions to investigate.	**B1**
Keeps original data and requires a justified, recorded reason for any exclusion; does not delete simply for disagreeing with the trend.	**B1**

Answer: **69 cm is a possible anomaly. All-results mean = 48.8 cm. Keep the original record, check for recording or method problems, and repeat under the same conditions. Exclude a result only with a justified reason, documented alongside the result; being inconvenient is not a reason.**

Question 3

Selects 12.4 cm.	**B1**
Links 0.1 cm to the millimetre divisions; 12 cm loses detail and 12.400 cm implies unsupported precision.	**B1**

Answer: **12.4 cm. A millimetre is 0.1 cm, so one decimal place in cm matches the ruler divisions; extra zeroes imply unsupported precision.**

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