

Chapter 11 Practical investigation

Section 11.1 Designing and planning the investigation

11.1 Review

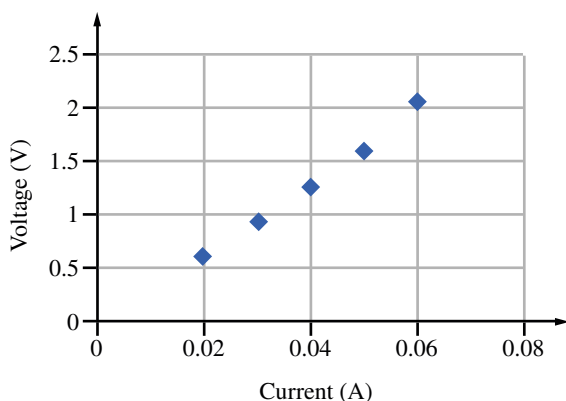
- 1
 - a If the voltage is measured in units of number of batteries then it is a discrete value.
 - b If the voltage is measured with a voltmeter then the voltage would be continuous.
- 2 qualitative
- 3 A. Hypothesis 1 is the best answer as it is a definite statement of the relationship between the independent and dependent variables.
- 4
 - a valid
 - b reliable
 - c accurate
- 5
 - a the tension in the elastic band
 - b the initial launch velocity of the elastic band
 - c the same elastic band, elastic band held in the same way, elastic band launched in the same direction, elastic band placed on the finger in the same way

Section 11.2 Conducting investigations and recording and presenting data

11.2 Review

- 1
 - a systematic error
 - b random error
- 2 Give answer to two significant figures, as this is the least number of significant figures in the data provided.
- 3
 - a $\text{mean} = (21 + 28 + 19 + 19 + 25 + 24) \div 6 = 22.7$
 - b mode = 19
 - c median = 22.5
 - d uncertainty in the mean: $28 - 23 = \pm 5$

4



- 5 as a line of best fit on the graph

Section 11.3 Discussing investigations and drawing evidence-based conclusions

11.3 Review

- 1 A linear graph shows the proportional relationship between two variables.
- 2 an inversely proportional relationship
- 3 a directly proportional relationship
- 4 time restraints and limited resources
- 5 An increase in current from 0.03 to 0.05 A produced an increase of 0.88 V across the resistor.

CHAPTER 11 REVIEW

- 1 A hypothesis is a prediction, based on evidence and prior knowledge, to answer the research question. A hypothesis often takes the form of a proposed relationship between two or more variables.
- 2 Dependent variable: flight displacement
Independent variable: release angle
Controlled variable: (any of) release velocity, release height, landing height, air resistance (including wind)
- 3
 - a the acceleration of the object
 - b the vertical acceleration of the falling object
 - c the rate of rotation of the springboard diver
- 4 Elimination, substitution, isolation, engineering controls, administrative controls, personal protective equipment.
- 5 $6.8 \pm 0.4 \text{ cm s}^{-1}$
- 6 the mean
- 7 an exponential relationship
- 8 This graph should show a straight line with a positive gradient.
- 9 Any issues that could have affected the validity, accuracy, precision or reliability of the data plus any sources of error or uncertainty.
- 10 Bias is a form of systematic error resulting from a researcher's personal preferences or motivations.