

Exercise 1A

- 1 Statistical tests provide a clear and objective means of deciding the differences between a model's predictions and experimental data. These tests will show if and how the model can be refined even further.
- 2 Predictions based on the model are compared with the experimental data. By analysing these, the model is adjusted and refined. The process is repeated.
- 3 Stage 1: The recognition of a real-world problem.
Stage 4: Experimental data is collected from the real world.
Stage 6: Statistical concepts are used to test how well the model describes the real-world problem.

Chapter review

- 1 Cheaper to use
Easier to use
They enable predictions to be made
Help improve the understanding of our world
Help to see how certain changes in variables will affect the outcomes
Help simplify complex situations

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Advantages	Disadvantages
They are relatively quick and easy to produce	Simplification of a real-world situation may cause errors as the model is too simplistic
They help enable predictions to be made	The model may work only in certain conditions

- 3 The answer could be, but is not limited to: 'Climate data can sometimes be too large to investigate thoroughly as it can be too time consuming, too expensive and logistically difficult to investigate. As a result, mathematical modelling can be used to simplify the model, but still give meaningful results.'
- 4
 1. Some assumptions need to be made to ensure the model is manageable. These include that birth and death rates.
 2. Plan a mathematical model which will include mathematical models and diagrams
 3. Use this model to predict the population over a period of years
 4. Include and collect new data that match the conditions of the predicted values.