* A mathematical model is a simplification of a real world situation. It can be used to make predictions and can improve our understanding of the phenomenon being studied

* Advantages

  - Quick and easy to produce

  - Can simplify a complex situation

  - Can help us improve our understanding of the real world as certain variables can readily be changed

  - Enables predictions to be made

  - Can help provide control

* Disadvantages

  - As it is a simplification of the real world, it does not include all aspects of the problem.

  - May only work in certain situations

* Designing a mathematical model

  ① A real world problem is observed

  ② A mathematical model is devised

  ③ The model is used to make predictions

  ④ Experimental data is collected from the real world

  ⑤ Predicted and observed outcomes are compared using statistical tests that assess how well the model describes the real world

  ⑥ The model is refined if necessary to improve it