# Scientific modelling SCMO

Applying computer simulation and other forms of computation to solve real-world problems in scientific disciplines.

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| **Guidance Notes:**  Activities may include, but are not limited to:   * identifying relevant mathematical principles and scientific theory within a computational model * creating, testing and tuning scientific models through the application of computing * validating and interpreting computational models against the reality which the models attempt to represent. |

## Level 4

Analyses the real-world problem, then selects appropriate physical and mathematical models to approximate the phenomena under investigation.   
Applies relevant mathematical techniques to simulate the problem.   
Conducts quality and performance assessments on computational model outputs and makes improvements to the models.   
Provides advice and guidance to the users of these models.

## Level 5

Investigates real-world problems to assess whether existing scientific models provide effective solutions.  
Creates new mathematical representations of the underlying science that can be implemented in a computational model. Applies advanced programming techniques to implement scientific models and apply these for problem-solving.   
Analyses the functioning of existing computational models to improve accuracy and performance.   
Communicates limitations such as uncertainty and systematic errors. Ensures appropriate usage of computational models.

## Level 6

Initiates the creation, testing, improvement and application of mathematical model frameworks representing real-world systems and scientific theories.   
Sets standards and approaches for the application of scientific modelling.   
Oversees the representation of science and mathematics principles and theories in models to ensure appropriate, consistent and effective usage.   
Develops or introduces new mathematical techniques where necessary.

## Level 7

Directs the creation and review of a cross-functional, enterprise-wide approach and culture for scientific modelling.   
Leads the development of the organisation’s scientific modelling capabilities and champions its use in solving real-world problems.