### Data science 1

#### Outcomes

A student:

* explains how data is used by scientists to model and predict scientific phenomena **SC4-DA1-01**
* uses data to identify trends, patterns and relationships, and draw conclusions **SC4-WS-06**
* identifies problem-solving strategies and proposes solutions **SC4-WS-07**

**Related Life Skills outcomes:** SCLS-DAS-01, SCLS-WS-06, SCLS-WS-07

#### Content

**Working scientifically**

In this focus area, students develop skills in analysing data and information, as well as identifying problem-solving strategies and proposing solutions to problems. Additional Working scientifically outcomes and skills may be integrated with this content**.**

**Related**: [Analysing data and information](https://curriculum.nsw.edu.au/learning-areas/science/science-7-10-2023/content/stage-4/faa7a5c228#cg-026b93d6-b1da-454c-a537-852180ad8fcf), [Problem-solving](https://curriculum.nsw.edu.au/learning-areas/science/science-7-10-2023/content/stage-4/faa7a5c228#cg-b59220b0-28b4-49c0-9e22-69796d0d5ed5)

##### Data science context

The Data science focus area can be taught alongside other focus areas, or aligned to students’ interests, local context or school environment.

##### Data

* Examine a range of sources of data and their applications

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| **Example(s):**  Data sources, including big data, experimental data, websites, digital technology. |

* Examine the digital footprint created by different online activities to recognise the importance of engaging safely with digital systems

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| **Example(s):**  Posting on social media, subscribing to a newsletter, leaving an online review, shopping online. |

* Recognise that data science is an interdisciplinary field that uses statistics, scientific methods and processes, algorithms and systems to develop knowledge by extracting or extrapolating insights from data

##### Scientific models

* Compare and contrast scientific inquiries of natural phenomena with nonscientific approaches

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| **Example(s):**  Evidence-based medicine compared to the non-scientific approach of iridology; neuroscience compared to phrenology (a pseudoscience). |

* Identify that a scientific model is a representation based on data and observations of real-world phenomena

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| **Example(s):**  Models of the Solar System; a particle model of matter; the atomic structure model. |

* Identify examples of the types of models used by scientists

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| **Example(s):**  Diagrams, physical 3D models, computer simulations, mathematical formulas. |

* Analyse a model to identify data and trends, and generate predictions

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| **Example(s):**  Examine a weather model to find patterns in temperature data and make forecasts about upcoming weather conditions. |

* Identify that computer-based models enable phenomena to be simulated, and variables can be easily changed to investigate their effect

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| **Example(s):**  Geological models of the changes to the Earth’s surface; weather forecasting models. |

##### Applications of models

* Identify data and observations used by scientists for the development of a model

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| **Example(s):**  The Big Bang model. |

* Outline how scientists develop workable theories from models

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| **Example(s):**  How astronomers developed workable theories about how the Universe came to be. |

##### Collecting, using and analysing datasets

* Formulate and investigate scientific questions that can be addressed with data

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| **Example(s):**  Investigations to collect datasets, such as class data, survey data, fieldwork datasets, first-hand collection of experimental data. |

* Conduct repeated experimental trials to calculate and compare the mean and range of data collected by different groups to discuss the accuracy and reliability of experimental data

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| **Example(s):**  Compare data collected in small groups to class sets of data. |

* Analyse data collected from a range of student investigations to look for patterns and test whether data is consistent with an initial prediction

##### Data science 1 in context

* Create a model that can be used to explain an observable phenomenon

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| **Example(s):**  A scientific model can be a visual, mathematical or computer model. |