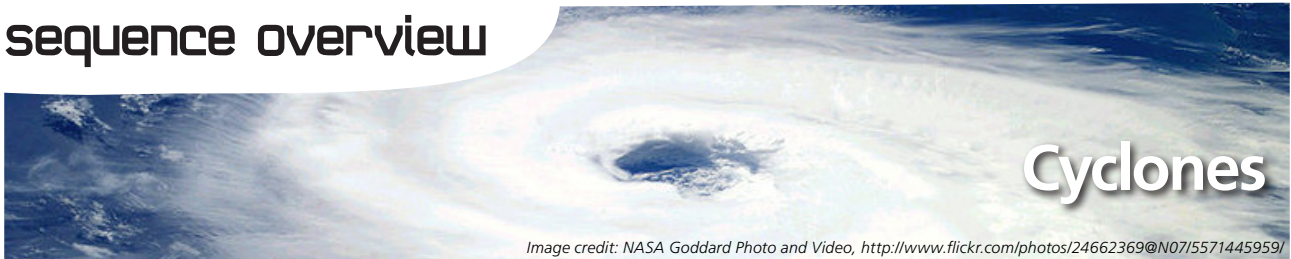


# sequence overview



Links to the Australian Curriculum: Science Year 10

## **Science understanding concepts include:**

**Earth and space sciences:** Global systems, including the carbon cycle, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere (ACSSU189)

- investigating how human activity affects global systems
- explaining the causes and effects of the greenhouse effect

## **Science as a human endeavour concepts include:**

**Nature and development of science:** Scientific understanding, including models and theories, are contestable and are refined overtime through a process of review by the scientific community (ACSHE191)

- considering the role of science in identifying and explaining the causes of climate change

**Use and influence of science:** People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions (ACSHE194)

- considering the scientific knowledge used in discussions relating to climate change

## **Science inquiry skills concepts include:**

**Processing and analysing data and information:** Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies (AC SIS203)

- using spreadsheets to present data in tables and graphical forms and to carry out mathematical analyses on data
- exploring relationships between variables using spreadsheets, databases, tables, charts, graphs and statistics

**Evaluating:** Critically analyse the validity of information in secondary sources and evaluate the approaches used to solve problems (AC SIS206)

- judging the validity of science-related media reports and how these reports might be interpreted by the public
- describing how scientific arguments, as well as ethical, economic and social arguments, are used to make decisions regarding personal and community issues

**Communicating:** Communicating ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (AC SIS208)

- constructing evidence based arguments and engaging in debate about scientific ideas
- presenting results and ideas using formal experimental reports, oral presentations, slide shows, poster presentations and contributing to group discussions



## Background

These SPICE resources may be drawn together into a learning pathway to develop students' understanding of how scientists use data to build models that may be used to inform discussions about climate change. The pathway is structured around a constructivist model based on the 5-Es where teachers may:

- **Engage** students' interest in the concept of scientific modelling by examining patterns of tropical cyclone activity. Students watch a presentation about cyclones (also known as hurricanes and typhoons) and raise questions about their occurrence.
- Provide opportunities for students to **Explore** patterns of occurrence of tropical cyclones. Students use an interactive learning object and fact sheet to gather and analyse data about cyclone activity in Western Australia.
- **Explain** how data can be used to build models and project inferences into the future, in relation to cyclone activity and global warming predictions.
- **Elaborate** on the complexity of using output from modelling processes, by examining scenarios produced by scientists, and how students' lives may be affected by climate change.
- **Evaluate** students' progress through the pathway and through summative reflection.

The resource is designed for year 10 students, but may also be used with students studying Earth and Environmental Science in years 11 and 12, at the discretion of the teacher.

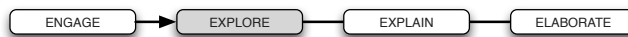
## Learning pathway



### *Cyclones 1: Looking at cyclones*

*Looking at cyclones* includes a teachers guide, video and presentation.

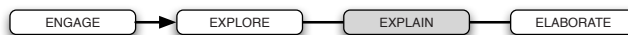
This resource engages students in the concept of scientific modelling by examining patterns of tropical cyclone activity. See the teachers guide for detailed information on the purpose and use of this resource.



### *Cyclones 2: Exploring tropical cyclones*

*Exploring tropical cyclones* includes a teachers guide, learning object, fact sheet and worksheet.

The resource explores patterns of cyclone formation associated with sea surface temperature and latitude. See the teachers guide for detailed information on the purpose and use of this resource.



### *Cyclones 3: Predicting tropical cyclones*

*Predicting tropical cyclones* includes a teachers guide, two worksheets and a spreadsheet.

This resource presents students with data about sea surface temperatures that may be analysed to predict future cyclone activity. This activity models processes used by scientists to make predictions. See the teachers guide for detailed information on the purpose and use of this resource.

## Cyclones 4: Modelling climate

*Modelling climate* includes a teachers guide, interactive learning object and three fact sheets.

This resource allows students to use their viewpoint on how the world might change under various climate change scenarios suggested by CSIRO research. The resource also highlights research into how human activities may be affected by global warming. See the teachers guide for detailed information on the purpose and use of this resource.

### Acknowledgements

Thanks Dr Karl-Heinz Wyrwoll, School of Earth and Environment at The University of Western Australia and Professor Shane Maloney, School of Anatomy, Physiology and Human Biology at The University of Western Australia.

Designed and developed by the Centre for Learning Technology, The University of Western Australia.  
Production team: Anton Ball, Alwyn Evans, Bob Fitzpatrick, Dan Hutton, Rebecca McKinney, Paul Ricketts, Gary Thomas and Michael Wheatley, with thanks to Pauline Charman, Jan Dook, Jenny Gull and Wendy Sanderson.

banner image: 'Cyclone Catarina from the ISS on 26 March 2004' by NASA, PD, commons.wikimedia.org/wiki/File:Cyclone\_Catarina\_from\_the\_ISS\_on\_March\_26\_2004.JPG

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