



sapphire coast  
**marine**  
**discovery**  
centre

# Murder in the Depths

## PRE-VISIT INFORMATION FOR TEACHERS

Murder in the Depths is a hands-on marine science outreach program that utilises interactive science activities and experiments to engage and inspire students to develop a new appreciation for marine science and the marine environment. Featuring a murder mystery, the students will use a range of scientific tests and explore a variety of science topics to uncover the mystery surrounding this death.

During this one hour program a Marine Education Officer will guide students through a range of learning activities. The students will work in rotating groups, visiting each of 6 work stations to conduct scientific experiments and use forensic science methods to establish the cause of death of a dugong. Students will use laboratory equipment, test water conditions and soil samples, conduct species identification, and use observational and analytical thinking skills to compile a scientific report and thus, solve the murder mystery. The program is designed for students in Years 5-6, Years 7-10 and Years 11 & 12, and can be tailored to suit your curriculum needs.

*It is important that teachers read and understand this pre-visit information and what is required for the delivery of the program.*

*Thank you.*



Australian  
National  
University

a proud sponsor of the Sapphire Coast Marine Discovery Centre

## PRE-VISIT INFORMATION

<b>Program duration</b>	1 hour (plus set up and pack up time)
<b>Program cost</b>	\$200 per session (maximum of 30 students per session)
<b>Bookings enquiries</b>	T: 02 6496 1699 E: <a href="mailto:education@sapphirecoastdiscovery.com.au">education@sapphirecoastdiscovery.com.au</a>

### What the school needs to do prior to our visit

- Confirm the date, time and numbers for the school visit via email.
- Let us know of any special topics you would like covered in your session. We are happy to tailor the program to best suit your learning requirements.
- During the visit the students will work in groups of 5 or 6 to allow a better learning impact. Please arrange these groups prior to the visit to make organisation on the day simpler.

### Program set-up and pack-up requirements

We will arrive 45 minutes prior to the start of the program, and will require access to the room to set up our resources. If we are running more than one program at your school, we would prefer to set up once and run the program for the different groups in one classroom. We will then need a minimum of 30 minutes to pack up. Any adult assistance with the set-up and pack-up of the program would be appreciated.

### What we need on arrival

- A space/room to set up in. The room will need to be big enough to fit the students sitting on the floor with a few tables set up around the edge. If possible a non-carpeted room is best as the activities involved can get messy.
- Six tables in the room on which to set up the activities
- An adult available to show us to the room

### Post visit evaluation

We aim to provide a high quality program and feedback is a wonderful way to help us continually improve. During the visit a Marine Education Officer will provide each teacher with feedback forms. We ask that teachers fill these in thoroughly and honestly. The forms can be completed and handed back on the day, or returned to the Centre via email, fax or post. Contact details are provided on the forms.

# Program related curriculum links

## Australian Science Curriculum

Source: <http://www.australiancurriculum.edu.au/Science/Curriculum/F-10>

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### Skip to year level

[Year 5](#)

[Year 6](#)

[Year 7](#)

[Year 8](#)

[Year 9](#)

[Year 10](#)

[Year 11 & 12](#)

- [Biology](#): [Unit 1](#)

- [Earth and Environmental Science](#): [Unit 1](#), [Unit 2](#), [Unit 4](#)

- [Chemistry](#): [Unit 1](#), [Unit 2](#)

### Year 5

**ACSSU043**- Living things have structural features and adaptations that help them to survive in their environment

**ACSHE081**- Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena

**AC SIS088**- Use equipment and materials safely, identifying potential risks

**AC SIS218** - Compare data with predictions and use as evidence in developing explanations

### Year 6

**ACSSU094** - The growth and survival of living things are affected by the physical conditions of their environment

**ACSSU096** - Sudden geological changes or extreme weather conditions can affect Earth's surface

**ACSHE098** - Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena

**AC SIS105** - Use equipment and materials safely, identifying potential risks

**AC SIS221** - Compare data with predictions and use as evidence in developing explanations

### Year 7

**ACSSU111** - There are differences within and between groups of organisms; classification helps organise this diversity

**ACSSU112** - Interactions between organisms can be described in terms of food chains and food webs; human activity can affect these interactions

**ACSHE119** - Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world

**ACSHE223** - Science knowledge can develop through collaboration and connecting ideas across the disciplines of science

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**ACSHE120** - Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations

**ACSHE121** - Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management

**ACSHE224** - People use understanding and skills from across the disciplines of science in their occupations

**AC SIS124** - Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge

**AC SIS130** - Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions

**AC SIS132** - Use scientific knowledge and findings from investigations to evaluate claims

**AC SIS133** - Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate.

## Year 8

**ACSSU150** - Multi-cellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce

**ACSSU225** - Chemical change involves substances reacting to form new substances

**ACSHE134** - Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world

**ACSHE226** - Science knowledge can develop through collaboration and connecting ideas across the disciplines of science

**ACSHE135** - Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations

**ACSHE136** - Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management

**ACSHE227** - People use understanding and skills from across the disciplines of science in their occupations

**AC SIS139** - Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge

**AC SIS145** - Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions

**AC SIS234** - Use scientific knowledge and findings from investigations to evaluate claims

**AC SIS148** - Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate

## Year 9

**ACSSU176** - Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems

**ACSSU178** - Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed

**ACSSU179** - Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer

**ACSHE160** - People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions

**AC SIS170** - Use knowledge of scientific concepts to draw conclusions that are consistent with evidence

**AC SIS171** - Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data

**AC SIS174** - Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations

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## Year 10

**ACSHE194** - People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions

**AC SIS204** - Use knowledge of scientific concepts to draw conclusions that are consistent with evidence

**AC SIS205** - Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data

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

## Year 11 & 12

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# Biology

## Unit 1: Biodiversity and the interconnectedness of life

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### *Science Inquiry Skills (Biology Unit 1)*

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**ACSBL005** - Interpret a range of scientific and media texts, and evaluate processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments.

**ACSBL007** - Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports.

### *Science as a Human Endeavour (Units 1 and 2)*

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**ACSBL010** - Advances in science understanding in one field can influence other areas of science, technology and engineering.

**ACSBL013** - Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions.

**ACSBL014** - Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability.

### *Science Understanding*

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#### Describing biodiversity

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**ACSBL016** - Biological classification is hierarchical and based on different levels of similarity of physical features, methods of reproduction and molecular sequences.

**ACSBL017** - Biological classification systems reflect evolutionary relatedness between groups of organisms.

**ACSBL020** - Relationships and interactions between species in ecosystems include predation, competition, symbiosis and disease.

**ACSBL021** - In addition to biotic factors, abiotic factors including climate and substrate can be used to describe and classify environments.

#### Ecosystem dynamics

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**ACSBL028** - Human activities (for example, over-exploitation, habitat destruction, monocultures, and pollution) can reduce biodiversity and can impact on the magnitude, duration and speed of ecosystem change.

# Earth and Environmental Science

## Unit 1: Introduction to Earth systems

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### *Science Inquiry Skills (Earth and Environmental Science Unit 1)*

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**ACSES001** - Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes.

**ACSES005** - Interpret a range of scientific and media texts and evaluate processes, claims and conclusions by considering the quality of available evidence; use reasoning to construct scientific arguments.

**ACSES007** - Communicate to specific audiences and for specific purposes using appropriate language, genres and modes, including compilations of field data and research reports.

### *Science as a Human Endeavour (Units 1 & 2)*

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**ACSES009** - Development of complex models and/or theories often requires a wide range of evidence from multiple individuals and across disciplines.

**ACSES010** - Advances in science understanding in one field can influence other areas of science, technology and engineering.

**ACSES013** - Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions.

**ACSES014** - Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability.

### *Science Understanding*

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#### Development of the geosphere

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**ACSES020** - Soil formation requires interaction between atmospheric, geologic, hydrologic and biotic processes; soil is composed of rock and mineral particles, organic material, water, gases and living organisms.

#### Development of the atmosphere and hydrosphere

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**ACSES024** - Water's unique properties, including its boiling point, density in solid and liquid phase, surface tension and its ability to act a solvent, and its abundance at the surface of Earth make it an important component of Earth system processes (for example, precipitation, ice sheet formation, evapotranspiration, solution of salts).

#### Development of the biosphere

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**ACSES027** - In any one location, the characteristics (for example, temperature, surface water, substrate, organisms, available light) and interactions of the atmosphere, geosphere, hydrosphere and biosphere give rise to unique and dynamic communities.

## Unit 2: Earth processes – energy transfers and transformations

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### *Science Inquiry Skills (Earth and Environmental Science Unit 2)*

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**ACSES030** – Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes.

**ACSES034** - Interpret a range of scientific and media texts and evaluate processes, claims and conclusions by considering the quality of available evidence; use reasoning to construct scientific arguments.

**ACSES036** - Communicate to specific audiences and for specific purposes using appropriate language, genres and modes, including compilations of field data and research reports.

### ***Science as a Human Endeavour (Units 1 & 2)***

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**ACSES038** - Development of complex models and/or theories often requires a wide range of evidence from multiple individuals and across disciplines.

**ACSES039** - Advances in science understanding in one field can influence other areas of science, technology and engineering.

**ACSES042** - Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions.

**ACSES043** - Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability.

### ***Science Understanding***

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Energy for atmospheric and hydrologic processes

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**ACSES051** - The behaviour of the global oceans as a heat sink, and Earth's rotation and revolution, cause systematic ocean currents; these are described by the global ocean conveyor model.

## **Unit 4: The changing Earth - the cause and impact of Earth hazards**

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### ***Science Inquiry Skills (Earth and Environmental Science Unit 4)***

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**ACSES084** - Identify, research and construct questions for investigation, propose hypotheses and predict possible outcomes.

**ACSES088** - Interpret a range of scientific and media texts and evaluate processes, claims and conclusions by considering the quality of available evidence, including interpreting confidence intervals in secondary data; use reasoning to construct scientific arguments.

**ACSES090** - Communicate to specific audiences and for specific purposes using appropriate language, genres and modes, including compilations of field data and research reports.

### ***Science as a Human Endeavour (Units 3 & 4)***

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**ACSES097** - Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability.

### ***Science Understanding***

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The cause and impact of Earth hazards

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**ACSES101** - Major weather systems generate cyclones, flood events and droughts; the occurrence of these events affects other Earth processes and interactions (for example, habitat destruction, ecosystem regeneration).

**ACSES103** - The impact of natural hazards on organisms, including humans, and ecosystems depend on the location, magnitude and intensity of the hazard, and the configuration of Earth materials influencing the hazard (for example, biomass, and substrate).

## **Chemistry**

### **Unit 1: Chemical fundamentals: structure, properties and reactions**

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#### ***Science Inquiry Skills (Chemistry Unit 1)***

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**ACSCH001** – Identify, research and refine questions for investigation; propose hypotheses; and predict possible outcomes.

**ACSCH005** - Interpret a range of scientific and media texts, and evaluate processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments.

**ACSCH008** - Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports.

### ***Science as a Human Endeavour (Units 1 and 2)***

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**ACSCH010** - Development of complex models and/or theories often requires a wide range of evidence from multiple individuals and across disciplines.

**ACSCH011** - Advances in science understanding in one field can influence other areas of science, technology and engineering.

**ACSCH014** - Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions.

**ACSCH015** - Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability.

### ***Science Understanding***

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#### Properties and structure of materials

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**ACSCH026** - Differences in the properties of substances in a mixture, such as particle size, solubility, magnetism, density, electrostatic attraction, melting point and boiling point, can be used to separate them.

#### Chemical reactions: reactants, products and energy change

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**ACSCH036** - All chemical reactions involve the creation of new substances and associated energy transformations, commonly observable as changes in the temperature of the surroundings and/or the emission of light.

## **Unit 2: Molecular interactions and reactions**

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### ***Science Inquiry Skills (Chemistry Unit 2)***

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**ACSCH040** – Identify, research, construct and refine questions for investigation; propose hypotheses; and predict possible outcomes.

**ACSCH042** - Conduct investigations, including measuring pH and the rate of formation of products, identifying the products of reactions, and testing solubilities, safely, competently and methodically for the collection of valid and reliable data.

**ACSCH044** - Interpret a range of scientific and media texts, and evaluate processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments.

**ACSCH047** - Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports.

### ***Science as a Human Endeavour (Units 1 and 2)***

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**ACSCH049** - Development of complex models and/or theories often requires a wide range of evidence from multiple individuals and across disciplines.

**ACSCH050** - Advances in science understanding in one field can influence other areas of science, technology and engineering.

**ACSCH053** - Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions.

**ACSCH054** - Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability.



## **Science Understanding**

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### Aqueous solutions and acidity

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**ACSCH061** - Water is a key substance in a range of chemical systems because of its unique properties, including its boiling point, density in solid and liquid phases, surface tension, and ability to act as a solvent.

**ACSCH064** - The presence of specific ions in solutions can be identified using analytical techniques based on chemical reactions, including precipitation and acid-base reactions.

**ACSCH066** - The pH scale is used to compare the levels of acidity or alkalinity of aqueous solutions; the pH is dependent on the concentration of hydrogen ions in the solution.



## School Group Feedback Form

School Name: \_\_\_\_\_

Teachers Name: \_\_\_\_\_ Year Level: \_\_\_\_\_

SCMDC Program: \_\_\_\_\_ Date: \_\_\_\_\_

Thank you for booking the Sapphire Coast Marine Discovery Centre. In order to provide quality programs into the future, we would appreciate your feedback.

Return by email [education@sapphirecoastdiscovery.com.au](mailto:education@sapphirecoastdiscovery.com.au) or fax to (02) 6496 2404.

- 1) How did the program meet your expectations (Please circle appropriate number)

Worse than Expected

As Expected

Exceeded Expectations

1

2

3

4

5

Comments:

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- 2) The program was helpful and informative (Please circle appropriate number)

Strongly disagree

Strongly agree

1

2

3

4

5

Comments:

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- 3) The program content was relevant to the students learning (Please circle appropriate number)

Strongly disagree

Strongly agree

1

2

3

4

5

Comments:

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Please turn over

4) How would you rate the information presented at your program? (Please circle appropriate number)

Very Poor                      Reasonable                      Excellent  
1                      2                      3                      4                      5

Comments:

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5) The presenter(s) and multimedia presentation (if applicable) were professional and accurate (Please circle appropriate number)

Strongly disagree                      Strongly agree  
1                      2                      3                      4                      5

Comments:

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6) What was the best aspect of the visit?

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7) How could we improve the program that your school participated in?

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8) I would recommend this education program and would participate again in the future

Strongly disagree                      Strongly agree  
1                      2                      3                      4                      5

9) Was this your first visit to/from the centre? Yes/No

10) Why did you make a return visit? \_\_\_\_\_

11) How did you find out about us?

Website                       Facebook                       Brochure/Flyer   
Word of mouth                       Email                       Other  \_\_\_\_\_

12) Are there any ideas you have regarding programs you would like us to run in the future?

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13) Any other comments

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**Thank you for taking the time to help us improve our programs and facilities.**