



# Stage 6 Chemistry Depth Study

## Water Recycling Field report/presentation

Sample Assessment task for St Marys Advanced Water Recycling Plant excursion

### Depth Study Inquiry Question

How does the application of chemistry (properties and uses of polymers) in an industrial setting (Sydney Water) help produce high quality recycled water and protect the environment?

### Context

Students will create a scientific field report or presentation related to application of polymers in the production of recycled water and protecting the environment. Students will do a fieldwork investigation on water recycling processes at St Marys Water Recycling Plant and St Marys Advance Water Recycling Plant, with secondary research and content from Modules 7 and/or 8.

Students will:

- participate in fieldwork investigating the processes at an advanced water recycling plant
- gather knowledge and skills to help understand the implications of chemistry for society and the environment.

The suggested Depth Study time allocated is 8 hours including:

1. Excursion/ fieldwork at St Marys Advanced Water Recycling Plant, where you will:
  - see how we apply polymers to produce high quality recycled water and biosolids
  - describe the procedures required to safely handle and dispose of organic substances (within the context of wastewater)
  - identify some of the environmental and economic implications of incorrect disposal of organic pollutants and use of polymer technology
  - understand how we produce recycled water within Environmental Protection Agency guidelines and the importance of monitoring pollutants that can impact the environment
2. 4 hours in class time for secondary research, data analysis and create report/presentation using our online resources and teacher/student investigations.

Task number: 3	Weighting: 25%	Timing: Term 2, Week 8
<b>Outcomes assessed</b> A student: <ul style="list-style-type: none"> <li>• analyses the structure of, and predicts reactions involving, carbon compounds. CH12-14</li> <li>• describes and evaluates chemical systems used to design and analyse chemical processes CH12-15</li> <li>• designs and evaluates investigations in order to obtain primary and secondary data and information CH11/12-2</li> <li>• analyses and evaluates primary and secondary data and information CH11/12-5</li> <li>• communicates scientific understanding using suitable language and terminology for a specific audience or purpose CH11/12-7</li> </ul>		
<b>Nature of the task</b> A report/presentation requires students to: <ul style="list-style-type: none"> <li>• describe the context of the site (<a href="#">St Marys Advance Water Recycling Plant</a>)</li> <li>• explain the relevance of the site to the investigation question</li> <li>• process and analyse first-hand lab activities, fieldwork and secondary data</li> <li>• communicate the results and conclusion of the fieldwork, lab and research investigations</li> </ul>		

**Outcomes:****Knowledge and understanding**

**CH12-14** analyses the structure of, and predicts reactions involving, carbon compounds.

- describe the procedures required to safely handle and dispose of organic substances
- model and compare the structure, properties and uses of addition polymers

**AND/OR**

**CH12-15** Describes and evaluates chemical systems used to design and analyse chemical processes

Students:

- analyse the need for monitoring the environment

**Planning**

**CH11/12-2** Designs and evaluates investigations in order to obtain primary and secondary data and information

Students:

- assess risks, consider ethical issues and select appropriate materials and technologies when designing and planning an investigation

**Analysis and problem solving**

**CH11/12-5** Analyses and evaluates primary and secondary data and information

Students:

- assess relevance and reliability of the gathered information
- collate useful and relevant information into water recycling process that relates to polymers and their uses and applications
- evaluate the effect of environmental monitoring

**Communicating**

**CH11/12-7** Communicates scientific understanding using suitable language and terminology for a specific audience or purpose

Students:

- propose ideas in a coherent and logical way and correctly use scientific terminology and principles
- present information on the science and chemistry of polymers and environmental monitoring
- summarise from a range of sources and appropriately acknowledge sources

**Conducting Investigations (Optional)**

**CH11/12-3** Conducts investigation to collect valid and reliable primary and secondary data and information

Students:

- employ and evaluate safe work practices and manage risks
- use appropriate technologies to ensure and evaluate accuracy
- select and extract information from a wide range of reliable secondary sources and acknowledge them using an accepted referencing style

### Marking Guidelines:

Students:	Range of Marks
<ul style="list-style-type: none"> <li>• assess risks, consider ethical issues and select appropriate materials and technologies</li> <li>• demonstrate comprehensive knowledge and understanding of using polymers based on chemical and physical properties that are applied in industries</li> <li>• evaluate the importance monitoring the environment</li> <li>• presents a detailed understanding of water recycling process that relates to the application of polymers to produce recycled water and protect the environment</li> <li>• assess the relevance and reliability of the gathered information</li> <li>• use scientific terminology and principles effectively</li> <li>• acknowledge sources appropriately and thoroughly</li> </ul>	21–25
<ul style="list-style-type: none"> <li>• assess risks, consider relevant issues, materials and technologies</li> <li>• demonstrate accurate knowledge and understanding of using polymers based on chemical and physical properties that are applied in industries</li> <li>• discuss the importance monitoring the environment</li> <li>• presents a water recycling process that collates useful and relevant information referring to the application of polymers and their uses and applications to produce recycled water and protect the environment</li> <li>• describe the relevance and reliability of the gathered information</li> <li>• use scientific terminology and principles</li> <li>• acknowledge sources appropriately</li> </ul>	16–20
<ul style="list-style-type: none"> <li>• assess risks, consider issues, materials and technologies</li> <li>• demonstrate sound knowledge and understanding of using polymers based on chemical and physical properties that are applied in industries</li> <li>• presents a water recycling process that outlines the applications or uses of polymers</li> <li>• describe relevance or reliability of the gathered information</li> <li>• use some scientific terminology</li> <li>• acknowledge sources</li> </ul>	11–15
<ul style="list-style-type: none"> <li>• assess risks, consider issues, materials or technologies</li> <li>• demonstrate basic knowledge and understanding of using polymers based on chemical and physical properties that are applied in industries</li> <li>• presents a water recycling process that identifies the applications or uses of polymers</li> <li>• outlines the relevance or reliability of the gathered information</li> <li>• use limited scientific terminology</li> <li>• acknowledge some sources</li> </ul>	6–10
<ul style="list-style-type: none"> <li>• assess risks</li> <li>• gather some relevant information about of using polymers based on chemical and physical properties that are applied in industries</li> <li>• present an incomplete water recycling that relates to polymers uses and applications</li> <li>• use some scientific terms</li> <li>• attempt to acknowledge some sources</li> </ul>	1–5

## Teacher Comments

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## Contact us

Sydney Water always want to hear from you, email us at: [education@sydneywater.com.au](mailto:education@sydneywater.com.au) or share with our social media channels:

- [facebook.com/SydneyWater](https://facebook.com/SydneyWater) 
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