




Summary	Duration
<p>This unit of work addresses outcomes from the <b>NSW K-6 Science and Technology syllabus for Stage 3</b></p> <p><b>Knowledge and Understanding</b> - <i>Made Environment - Built Environments</i></p> <p><b>Skills</b> - <i>Working Technologically</i></p> <p>This unit provides an authentic, project based learning approach to understanding stormwater as a local and broader issue facing made environments.</p> <p>Students will engage in the Sustainability Action Process to understand stormwater issues, best practice management, design and implement a stormwater management or education plan for their school.</p> <p>You can find all the resources and links to download the free multi touch iBook here:</p> <p><a href="http://brewongleec.com/resources/stage-3-resources/">http://brewongleec.com/resources/stage-3-resources/</a></p>	<p>Sample term</p> <p>10 weeks</p> <p>Detail: 3 hrs per week. This program has been designed by:</p> <div style="display: flex; justify-content: space-around; align-items: center;">   <div style="text-align: center;"> <p><b>Education</b> Public Schools</p> </div> </div>

Outcomes	Unit overview	Key inquiry questions
<p><b>Science K-10</b></p> <ul style="list-style-type: none"> <li>› ST3-1VA shows interest in and enthusiasm for science and technology, responding to their curiosity, questions and perceived needs, wants and opportunities</li> <li>› ST3-2VA demonstrates a willingness to engage responsibly with local, national and global issues relevant to their lives, and to shaping sustainable futures</li> <li>› ST3-5WT plans and implements a design process, selecting a range of tools, equipment, materials and techniques to produce solutions that address the design criteria and identified constraints</li> <li>› ST3-14BE describes systems in built environments and how social and environmental factors influence their design</li> </ul>	<p>A project based enquiry unit of work on stormwater developed for Blacktown City Council utilising the Sustainability Action Process.</p> <p><b><i>Inquiry Rationale</i></b></p> <p>Investigating the 21st century stormwater management strategies at Blacktown City provides students with the knowledge, skills and understandings to be active citizens developing real and informed suggestions for improved stormwater management at school, home or community.</p> <div style="text-align: center;">  </div>	<p>What is stormwater?</p> <p>What is best practice regarding stormwater management?</p> <p>Can you investigate stormwater issues around your school, home or community?</p>

Learning across the curriculum	Quality Teaching Elements	Sustainability Education Polic
<p><i>ross-curriculum priorities enable students to develop understanding about and address the contemporary issues they face.</i></p> <p><a href="http://syllabus.bos.nsw.edu.au/science/science-k10/learning-across-">http://syllabus.bos.nsw.edu.au/science/science-k10/learning-across-</a></p>	<p><b>Intellectual Quality</b></p> <p><b><i>Metalinguage</i></b> - using and explaining scientific language and identifiers</p> <p><b><i>Substantive communication</i></b> - sustained and reciprocal communication</p>	<p><b>Students will develop:</b></p> <p><b>knowledge and understandings about:</b></p> <ul style="list-style-type: none"> <li>▪ the impact of people on environments</li> </ul>

**Sustainability** is concerned with the ongoing capacity of the Earth to maintain all life. It provides authentic contexts for exploring, investigating and understanding systems in the natural and made environments. Relationships, cycles and cause and effect are explored, and students develop observation and analytical skills to examine these relationships in the world around them to design solutions to identified sustainability problems.

**Critical and creative thinking**

Critical and creative thinking are integral to activities where students learn to generate and evaluate knowledge, clarify concepts and ideas, seek possibilities, consider alternatives and solve problems.

**Information and communication technology capability**

Information and communication technology (ICT) can be used effectively and appropriately to access, create and communicate information and ideas, solve problems and work collaboratively.

**Literacy**

Literacy is the ability to use a repertoire of knowledge and skills to communicate and comprehend effectively, using a variety of modes and media. Being 'literate' is more than the acquisition of technical skills - it includes the ability to identify, understand, interpret, create and communicate effectively using written, visual and digital forms of expression and communication for a number of purposes.

**Numeracy**

Numeracy involves students in recognising and understanding the role of mathematics in the world. Students become numerate as they develop the confidence, willingness and ability to apply mathematics in their lives in constructive and meaningful ways.

throughout the lesson

**Quality Learning Environment**

**Engagement** - sustained interest, attentiveness and focus on the tasks at hand

**High expectations** - learning important knowledge and skills of a challenging nature

**Students' Self-Regulation** - activities are purposeful and interesting resulting in low levels of interruption and high levels of initiative

**Significance**

**Background Knowledge** - opportunities to make connections between their knowledge and experience and the content of the lesson

**Connectedness** - content has meaning beyond the classroom and the site.









▪ the principles of ecologically sustainable development















**skills in:**

- identifying and assessing environmental problems
- applying technical expertise within an environmental context; adopting behaviours and practices that protect the environment
- resolving environmental problems
- evaluating the success of their actions

**values and attitudes relating to:**

- a respect for life on Earth
- a commitment to act for the environment by supporting long term solutions to environmental problems.

Content	Teaching & learning activities
<p>Stage 3 - Built Environments</p> <ul style="list-style-type: none"> <li>consider ways that the design or use of places and spaces have changed over time and the social and/or environmental factors that have influenced these changes, eg changes in the design and use of a library due to technological developments or the design of buildings after an earthquake </li> <li>generate and develop ideas about how built environments might be designed and constructed in the future to incorporate sustainable environmental practices, eg the use of recycled materials, natural lighting and solar energy </li> <li>develop designs and solutions to meet specific social or environmental needs of users, eg an energy-efficient building or high-traffic airport terminal/train station</li> </ul> <p>Stage 3 - Working Technologically</p> <p>Students explore and define a task by:</p> <ul style="list-style-type: none"> <li>exploring needs for, or opportunities to undertake, the task</li> <li>identifying the users' needs and wants using techniques, eg observations, surveys, interviews and market research </li> <li>developing a design brief individually and in collaboration with others </li> <li>developing design criteria that considers, where relevant, function, aesthetics, social and environmental considerations </li> <li>planning the process considering constraints where relevant, eg time, finance, resources and expertise </li> </ul> <p>Students generate and develop ideas by:</p> <ul style="list-style-type: none"> <li>selecting and using creative thinking techniques, including mind-mapping, brainstorming, sketching and modelling </li> <li>selecting and using research techniques appropriate to the task </li> </ul>	<p>The iBook – “What Happens to the Rain” can help guide your students through the whole unit of work. It provides help for an excursion to Blacktown Showground, or is an excellent virtual tool for understanding water management in the classroom. Download via this link:</p> <p><b>Introduction to the Sustainability Action Process</b></p> <p>Discuss with the students that the Sustainability Action Process is a methodology used to investigate sustainability issues. It comprises us asking 5 key steps;</p> <p>Step1.Making the case for change</p> <p>Step 2. Defining the scope for action</p> <p>Step 3 Developing the proposal for action</p> <p>Step 4 Implementing the proposal</p> <p>Step 5 Evaluating the proposal</p> <p><b>Sustainability Action process Step 1.</b></p> <p><b><i>Making the case for change</i></b></p> <p><b>Exploring stormwater.</b></p> <p>What is stormwater?</p> <p>Why is stormwater a problem?</p> <p>Where do stormwater pollutants come from?</p> <p><b><i>Field Trip</i></b> - Blacktown City Council Showground using iPad iBook.</p> <p>OR</p> <p><b><i>Virtual Field Trip</i></b> using iBook in the classroom.</p>

Content	Teaching & learning activities
<ul style="list-style-type: none"> <li>▪ selecting and using techniques for documenting and communicating design ideas to others, eg drawings, plans, flow charts, storyboarding, modelling and presentations, using digital technologies    </li> <li>▪ identifying a range of appropriate materials for the task</li> <li>▪ selecting and using techniques to investigate the suitability of materials  </li> <li>▪ applying established criteria to evaluate and modify ideas</li> </ul> <p>Students produce solutions by:</p> <ul style="list-style-type: none"> <li>▪ testing the suitability of materials, considering whether the test was fair or not</li> <li>▪ developing a plan and specifications to guide production  </li> <li>▪ using their plans and production sequence</li> <li>▪ for a design project, selecting and safely using a range of tools, equipment and related techniques to cut, edit, join, manipulate and shape materials and/or information   </li> </ul> <p>Students evaluate by:</p> <ul style="list-style-type: none"> <li>▪ identifying the strengths and limitations of the process used  </li> <li>▪ self or peer assessing the final product by using the established design criteria </li> </ul>	<p><i>Resources:</i></p> <ul style="list-style-type: none"> <li>* iBook "What Happens to the Rain?" by Steven Body - <a href="https://itunes.apple.com/au/book/what-happens-to-the-rain/id1084586515?mt=13">https://itunes.apple.com/au/book/what-happens-to-the-rain/id1084586515?mt=13</a></li> <li>* Sustainability Action process An Overview <a href="http://brewongle.files.wordpress.com/2014/11/sustainability-action-process-an-overview.pdf">http://brewongle.files.wordpress.com/2014/11/sustainability-action-process-an-overview.pdf</a></li> <li>* Sustainability Action process Diagram <a href="http://brewongle.files.wordpress.com/2014/11/sustainability-action-process-an-overview.pdf">http://brewongle.files.wordpress.com/2014/11/sustainability-action-process-an-overview.pdf</a></li> </ul> <p>* Stormwater Teacher Support Resources(2)<a href="https://brewongle.files.wordpress.com/2014/11/stormwater-teacher-resource-2.pdf">https://brewongle.files.wordpress.com/2014/11/stormwater-teacher-resource-2.pdf</a></p> <p><b>Sustainability Action Process Step 2.</b></p> <p><i>Defining the scope for action.</i></p> <p><b>Where does the stormwater at your school go?</b></p> <p>Discover your local creek by using the google maps tool inserted in the iBook in Chapter 3 to do this.</p> <p>Where does the water from your local creek flow to?</p> <p>How healthy is your local creek?</p> <p>Make a map of water flowing to your local creek linking you to your catchment.</p> <p>Are there stormwater issues such as erosion, rubbish, sediment, nutrient issues at your school?</p> <p><b>Stormwater Audit</b></p> <p>Conduct a stormwater audit at your school.</p> <p>Make an assessment of the storm water issues affecting your school.</p> <p><b>Stormwater Management</b></p> <p>What can you do to improve to improve the quality of stormwater</p>

Content	Teaching & learning activities
	<p>flowing into our bushland, creeks and rivers?</p> <p><b>Water Sensitive Urban Design</b></p> <p>What is water sensitive urban design?</p> <p><i>Resources:</i></p> <p>Working Scientifically: Stormwater Audit Scaffold  <a href="https://brewongle.files.wordpress.com/2014/11/working-scientifically-stormwater-audit-scaffold.pdf">https://brewongle.files.wordpress.com/2014/11/working-scientifically-stormwater-audit-scaffold.pdf</a></p> <p>Working Scientifically: Stormwater Audit Recording sheet  <a href="https://brewongle.files.wordpress.com/2014/11/working-scientifically-stormwater-audit-recording-sheet.pdf">https://brewongle.files.wordpress.com/2014/11/working-scientifically-stormwater-audit-recording-sheet.pdf</a></p> <p><b>Sustainability Action Process Step 3.</b></p> <p><i>Developing the proposal for action.</i></p> <p><b>Working Technologically</b></p> <p>After identifying all the stormwater issues affecting your school now undertake the Water Sensitive Urban Design Task.</p> <p><b>Student Task:</b></p> <p>In small groups, students develop a design brief for Water sensitive Urban Design (WSUD) to be incorporated in your school.</p> <p><i>Resources:</i></p> <p>* Working Technologically: Water Sensitive Urban Design teacher Overview  <a href="https://brewongle.files.wordpress.com/2014/11/working-technologically-wsud-design-task-teacher-overview.pdf">https://brewongle.files.wordpress.com/2014/11/working-technologically-wsud-design-task-teacher-overview.pdf</a></p> <p>* Working Technologically Student Scaffold  <a href="https://brewongle.files.wordpress.com/2014/11/working-technologically-wsud-student-scaffold.pdf">https://brewongle.files.wordpress.com/2014/11/working-technologically-wsud-student-scaffold.pdf</a></p> <p>* WSUD Priority organiser  <a href="http://brewongle.files.wordpress.com/2014/11/wsud-proposals-priority-organiser.pdf">http://brewongle.files.wordpress.com/2014/11/wsud-proposals-priority-organiser.pdf</a></p> <p>As a class, student's present ideas and class decide on a course of action democratically. Use the priority organiser.</p>

Content	Teaching & learning activities
	<p>Do you need wider community involvement or expertise?</p> <p>Agreed proposal/s for action are to be communicated to school Principal/Teachers/Students to gain agreement.</p> <p><b>Sustainability Action Process Step 4. <i>Implementing the proposal.</i></b></p> <p><b>Putting the WSUD proposal into action.</b></p> <p>How, when, where and who?</p> <p><b>Sustainability Action Process Step 5.</b></p> <p><b><i>Evaluating the proposal.</i></b></p> <p><b>Was your WSUD design brief effective?</b></p> <p>Does it meet the design criteria?</p> <p>Does it solve the problem?</p> <p>Are there improvements and how do you know?</p> <p>What did you learn? Problems in the process, learnings?</p> <p><i>Resources;</i></p> <p><i>* Evaluation of WSUD Recommendations</i></p> <p><a href="https://brewongle.files.wordpress.com/2014/11/evaluation-of-wsud-recommendations.pdf">https://brewongle.files.wordpress.com/2014/11/evaluation-of-wsud-recommendations.pdf</a></p>

Links to literacy continuum	Useful links or resources
<p>Cluster 11</p> <p>Analyses and evaluates the relative importance of key ideas and information in a text to construct an overview.</p> <p>Refines vocabulary choice in response to purpose and audience when editing and reviewing own and peer's writing</p> <p>Plans and designs more complex multimodal texts</p> <p>Uses multimedia to enhance meaning when communicating ideas and information to others</p>	<p>iBook</p> <p><a href="#">Sustainability Action Process - An Overview</a></p> <p><a href="#">Stormwater Teacher Support Resources(2)</a></p> <p><a href="#">Working Scientifically - Stormwater Audit</a></p> <p><a href="#">Working Scientifically: Stormwater Audit Recording Sheet</a></p> <p><a href="#">Working Technologically - Water sensitive Urban Design Student Task</a></p>