

Crownies Create – Stem Project – 3/4 Manta Rays ‘War on Waste’


CONTEXT


This unit provides students with an opportunity for an integrated STEM approach to teaching and learning. They will apply mathematical calculations, scientific skills and a design process to identify a need, research and develop a solution, work collaboratively, and to document, present and evaluate their solution.

Sustainability education can be fun, engaging and empowering for students. It allows them to take responsibility for their actions and to contribute their vision for a sustainable future. It enables them to develop knowledge, skills, values and motivations for action, allowing them to maintain their own wellbeing and that of their community and the planet in an increasingly interconnected world.

LEARNING ACROSS THE CURRICULUM (General and cross curricular capabilities)

Critical and creative thinking 


Ethical understanding 


Information and communication technology capability 

Literacy 

Numeracy 

Personal and social capability 

Sustainability 

Work and enterprise 

QUALITY TEACHING ELEMENTS

Intellectual quality

Deep understanding

Problematic knowledge

Higher-order thinking

Substantive communication

Quality learning environment

Engagement

Social support

Students’ self-regulation

Student direction

Significance

Background knowledge

Knowledge integration

Inclusivity

Connectedness

Narrative

OUTCOMES

Science K–10

ST2-4WS investigates their questions and predictions by analysing collected data, suggesting explanations for their findings, and communicating and reflecting on the processes undertaken

ST2-5WT applies a design process and uses a range of tools, equipment, materials and techniques to produce solutions that address specific design criteria

ST2-11LW describes ways that science knowledge helps people understand the effect of their actions on the environment and on the survival of

living things

ST2-13MW identifies the physical properties of natural and processed materials, and how these properties influence their use

ST2-15I describes ways that information solutions are designed and produced, and factors to consider when people use and interact with information sources and technologies

ST2-16P describes how products are designed and produced, and the ways people use them

Mathematics K–10

MA2-1WM uses appropriate terminology to describe, and symbols to represent, mathematical ideas

MA2-2WM selects and uses appropriate mental or written strategies, or technology, to solve problems

MA2-5NA uses mental and written strategies for addition and subtraction involving two-, three-, four- and five-digit numbers

MA2-9MG measures, records, compares and estimates lengths, distances and perimeters in metres, centimetres and millimetres, and measures, compares and records temperatures

MA2-10MG measures, records, compares and estimates areas using square centimetres and square metres

MA2-11MG measures, records, compares and estimates volumes and capacities using litres, millilitres and cubic centimetres

MA2-14MG makes, compares, sketches and names three-dimensional objects, including prisms, pyramids, cylinders, cones and spheres, and describes their features

MA2-18SP selects appropriate methods to collect data, and constructs, compares, interprets and evaluates data displays, including tables, picture graphs and column graphs

English K–10

EN2-1A communicates in a range of informal and formal contexts by adopting a range of roles in group, classroom, school and community contexts

EN2-2A plans, composes and reviews a range of texts that are more demanding in terms of topic, audience and language

EN2-3A uses effective handwriting and publishes texts using digital technologies

EN2-4A uses an increasing range of skills, strategies and knowledge to fluently read, view and comprehend a range of texts on increasingly challenging topics in different media and technologies

EN2-9B uses effective and accurate sentence structure, grammatical features, punctuation conventions and vocabulary relevant to the type of text when responding to and composing texts

EN2-10C thinks imaginatively, creatively and interpretively about information, ideas and texts when responding to and composing texts

EN2-11D responds to and composes a range of texts that express viewpoints of the world similar to and different from their own

EN2-12E recognises and uses an increasing range of strategies to reflect on their own and others' learning

Geography K -10

GE2-2 describes the ways people, places and environments interact

GE2-3 examines differing perceptions about the management of places and environments

PROJECT OVERVIEW

Students investigate waste creation and management at Crown Street Public School. They develop key understandings about pressures on the environment, ecosystems and people's health caused by waste, and explore ways of improving waste management at Crown Street Public School to help build a sustainable future.

KEY INQUIRY QUESTIONS

What is sustainability?

How can we reduce our waste and become more sustainable?

Where do products end up? (renewed, recycled or waste)

How does waste affect our environment?

Why is it important to be more socially aware of the effects of waste?

Why is it important that we are aware of the benefits of being sustainable?

PHASE

TEACHING /LEARNING / ASSESSMENT

EMPHASISE & ENGAGE

Launch the context and stimulate curiosity: How can we make our school environment better?

Students collectively brainstorm problems and problem areas on the school site. Students can walk the school site and take photos of areas they have identified using the iPads. Following, have students summarise all ideas and vote on the most visible problem.

The issue: Waste!

- Share the BTN story 'War on Waste School' episode

<http://www.abc.net.au/btn/story/s4689455.htm>

Ask students; What do you THINK about what you saw in this video? What does this video make you

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| | <p>WONDER?</p> <ul style="list-style-type: none"> ▪ Share the BTN story 'Landfill' episode http://www.abc.net.au/btn/story/s3953606.htm ▪ Students should brainstorm ideas about waste reduction at Crown Street PS following the episodes. ▪ Jointly watch ABC's War on Waste documentary http://education.abc.net.au/home#!/digibook/2597026/war-on-waste ▪ Students should add to their ideas bank following the documentary. ▪ Jointly play the 'Your rubbish pile, reduce your waste' interactive online game http://www.scootle.edu.au/ec/viewing/L1004/index.html ▪ Students should brainstorm the meaning of sustainability. ▪ View the YouTube clip, 'What is sustainability?' https://www.youtube.com/watch?v=gTamnlXbgqc <p>Discuss and identify the key points of sustainability as defined in the clip.</p> <ul style="list-style-type: none"> ▪ Have students brainstorm why sustainability is important and produce 'I wonder questions' beginning with who, what, when, where, why? For example, Who is using the rubbish bin? Why/why not? What is its' purpose? When is it being used? Where is it being used? What would happen without the bin? What improvements could you make? ▪ Ask students, if we were to introduce a new waste and recycling program at CSPA, what difficulties could we face? Students to work in pairs and discuss. |
| <p>DEFINING</p> | <ul style="list-style-type: none"> ▪ Discuss with students; <p>How can I measure and describe the different types of waste the school creates?</p> <p>Who do I need to talk to about waste in our school?</p> <p>How is waste dealt with in our school?</p> |

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| | <ul style="list-style-type: none"> ▪ Have students conduct a waste audit survey to see what the current situation is. [Discuss safety and issues when investigating waste] ▪ Following waste audit, have students collate information in both a Microsoft Word table and Microsoft Excel graph. What do the results tell us? |
| <p>IDEATING</p> | <p><u>These activities involve exploring and evaluating a range of strategies for reducing waste, in order to create and implement a waste reduction campaign or action plan at CSPS.</u></p> <ul style="list-style-type: none"> ▪ After looking at data of rubbish audit, have students brainstorm as many ways of reducing waste as they can think of. Some questions to use with students: How would this improve or change the environment? What will it cost in money, time and resources? Who will pay for it? What benefits are there for the community? Is the solution fair to all concerned? What are the short- and long-term benefits? Is it the best use of community money, time and resources? <p><u>Guest Speakers: P&C Environmental Committee</u></p> <ul style="list-style-type: none"> ▪ Students to prepare questions to ask the P&C Environmental Committee about their visit to a Sustainable School and their ideas for a more sustainable and environmentally friendly Crown Street. ▪ During visit, students to take notes on ideas. ▪ Following visit, students share notes, review brainstormed list of ideas and discuss most realistic goals for our school. Students to also write a joint persuasive letter to P&C Environmental Committee to ask for assistance with applying for a Woolworths Junior Landcare Grant to fund a new Recycling and Waste management program <p>https://landcareaustralia.org.au/woolworthsgrants/</p> <ul style="list-style-type: none"> ▪ Students should watch 'War On Waste: Sturt Primary School' <p>https://www.youtube.com/watch?v=sr_-yaMgTbU</p> |

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| | <p>Is this something we could achieve at Crown Street Public School? Discuss.</p> |
| <p>PROTOTYPING</p> | <ul style="list-style-type: none"> ▪ In a teacher-led discussion, have students consider how we could educate students about a new rubbish and recycling program. What should our new rubbish and recycling program look like? ▪ Students should plan by drawing out their proposed ideas. <p><u>Guest Speaker: Susanna Harrison; Local Graphic Designer and Illustrator</u></p> <ul style="list-style-type: none"> ▪ Students share their ideas for new bin designs with guest speaker. ▪ With Susanna’s guidance, students are tasked with redesigning their bin stickers and bin designs. [Teacher to forward student designs electronically to designer to mock up designs. These to be shared with students and redesign keeps occurring until final design agreed upon.] ▪ Students should present and justify their waste reduction solutions to the Principal. |
| <p>IMPLEMENTING</p> | <ul style="list-style-type: none"> ▪ Implement waste reduction campaign including introducing new bins on the school playground. |
| <p>EVALUATION</p> | <ul style="list-style-type: none"> ▪ Students should write a short statement about how they could change their future behaviour and encourage others to change, based on what they have learned over the project. What should the next steps be about sustainability at CSPA? |