

CULTURAL CONNECTION

LEVEL

Year 11

VCE: Systems Engineering

ACTIVITY DESCRIPTION

Technologies have been an integral part of Aboriginal and Torres Strait Island cultures for over 60,000 years, continuing to play an important part in cultural life today. Aboriginal and Torres Strait Island peoples are among the world's oldest and continually active and adaptive designers, innovators and engineers.

Students will engage with resources to learn more about Aboriginal and Torres Strait Islander cultures and narratives. Students will expand their knowledge of emerging developments and innovations through learning about Aboriginal and Torres Strait Islander Designers and Engineers that have played a key role in the design, technologies and digital technologies fields. Students will investigate and analyse a particular emerging Indigenous designer, or design, and present the impact of these designs to their peers. Post these investigations students will reflect what they have learnt through discussion and the completion of the "Cultural Connection" Worksheet.

NOTE: Teaching staff are encouraged to consult with their local Aboriginal and Torres Strait Islander community in engaging with the material in this resource or to extend student learning.

SUBJECT AREA

Systems Engineering Unit 4: Systems Control

Area of Study 2 – New and Emerging Technologies

MATERIALS REQUIRED

- "Cultural Connection" Worksheet
- "Cultural Connection" Task Description
- Presentation Rubric (for students)
- Electronic devices with access to the internet
- Microsoft PowerPoint or access to other multimedia/presentation programs

INSTRUCTIONS

PART A – GROUP DISCUSSION

1. As a whole group activity introduce the concept of Indigenous systems design by watching the video: Introducing Bruce Pascoe - Bruce Pascoe: Aboriginal Agriculture, Technology and Ingenuity - ABC Education <https://www.abc.net.au/education/aboriginal-ingenuity-ch-1-introducing-bruce-pascoe/13585434>

After the video:

- Discuss why Bruce wrote Dark Emu?
- Why does Bruce believe it's important to learn the history of Indigenous Australia?
- In small groups or pairs have students discuss why it is important to learn the history of Indigenous Australia?
- Share discussions

2. Discuss Indigenous Engineering – watch the Bruce Pascoe Video – 9.1 Lake Condah Aquaculture (Bruce Pascoe: Aboriginal Agriculture, Technology and Ingenuity - ABC Education). <https://www.abc.net.au/education/aboriginal-ingenuity-ch-13-lake-condah-aquaculture/13500228>

3. Discuss the ingenuity of Aboriginal people in aquaculture that can be seen by visiting the fish traps in Brewarrina, NSW, and the UNESCO World Heritage-listed eel traps at Lake Condah, Victoria.

Extend this discussion by watching video 9.2 Aquaculture Machine (Bruce Pascoe: Aboriginal Agriculture, Technology and Ingenuity - ABC Education) (Add link) <https://www.abc.net.au/education/aboriginal-ingenuity-ch-14-aquaculture-machine/13585670>

- Discuss how these are examples of engineering being used thousands of years ago.
- Discuss the use of sophisticated technological and philosophical knowledge systems in response to changing social and environmental circumstances. This has enabled people to manage resources sustainably and reliably for thousands of years.

4. On the screen show students other examples of Ingenious Indigenous Engineering:

- The Kimberley Raft
- Thuwarri Thaa Aboriginal ochre mine
- Budj Bim eel traps
- Yidaki
- Brewarrina fish traps

REFERENCE: *5 Indigenous engineering feats you should know about | SBS NITV* <https://www.sbs.com.au/nitv/article/5-indigenous-engineering-feats-you-should-know-about/dmb5gi0ay>

Choose a few of the designs above to discuss with students. Evaluate these designs and speak about the impacts of these designs on Country, culture and today's society.

PART B – INFORMATION GATHERING

1. Distribute “Cultural Connection” Task Description.
2. Split students into pairs or groups (teacher's choice).
3. Ask students to research an Aboriginal and/or Torres Strait Islander Designer and/or Engineer that have played a key role in the design, technologies and digital technologies fields. Students will investigate and analyse a particular emerging Indigenous designer, or design, and

present the impact of these designs to their peers. The aim of this task is to provide students with the skills to research and evaluate designs while gaining a better understanding of the importance of Aboriginal and Torres Strait Island cultures on today's world.

Give students time to research. Students will need to take note of where they are finding this information and if the sources are reputable.

PART C – PRESENTATION OF FINDINGS

Teachers to allocate an appropriate amount of time to Part A and B. Once part A and B are complete students will present their findings in a multimedia presentation. Teachers and students can use the attached Rubric to provide feedback and assessment of student's presentations on their chosen Aboriginal and Torres Strait Islander design or designer.

NOTE: A list of Aboriginal and Torres Strait Islander Designers and Engineers can be found in Background Information.

EXTENSION: Where possible, organise an excursion to a public Aboriginal and Torres Strait Islander technologies organisation, event or exhibition. Alternatively, invite a local Aboriginal or Torres Strait Island Designer or Engineer to come and speak to your students, perhaps even collaborate to develop a design brief for them. Teachers and students may consider engaging with local Aboriginal and Torres Strait Island contributors to learn more about their cultural connection to Country and how they incorporate these connections into their innovative technological designs.

If you visit an external site, what learnings and messages did students take away from the excursion? Were there any collaborations occurring between this Aboriginal and Torres Strait Islander organisation and non-Indigenous organisations, and/or can students think of any potential positive avenues for collaboration moving forward? Could your school work with these organisations?

✓ SUGGESTIONS FOR ASSESSMENT

Ability to present research, findings, and information about Aboriginal and Torres Strait Islander designs and/or designers, in a multimedia format. Discussion and completion of the reflective questions on the “Cultural Connection” Worksheet.

▶ CURRICULUM LINKS

SYSTEMS ENGINEERING

Unit 4: Systems Control

Area of Study 2 – New and emerging technologies

On completion of this unit the student should be able to evaluate a range of new or emerging systems engineering technologies and analyse the likely impacts of a selected technology.

🔍 BACKGROUND INFORMATION

CULTURAL ADVICE

Aboriginal and Torres Strait Islander peoples should be aware that this website may contain records and online resources of images, voices or names of deceased persons in photographs, film, audio recordings or print materials.

NOTE: The information in this resource is a guide, the teaching staff are encouraged to consult with their local Aboriginal and Torres Strait Islander community in engaging with engineering principles and materials outlines in this resource.

“Indigenous people are among the most innovative people in the world, and we do use complex technology, and we are able to lead in this space of digital technology,” – Michaela Jade, Aboriginal digital designer

TIMELINE OF KEY DATES IN THE CONTEMPORARY HISTORY OF ABORIGINAL AND TORRES STRAIT ISLANDER TECHNOLOGIES

Reference: [technologies-design-technologies-and-digital-technologies-resource-guide-f8b116ab41.pdf](https://narragunnawali.org.au/technologies-design-technologies-and-digital-technologies-resource-guide-f8b116ab41.pdf) (narragunnawali.org.au)



60,000+ YEARS AGO: Aboriginal and Torres Strait Islander communities across Australia have maintained longstanding conventions and conceptualisations pertaining to technologies for tens of thousands of years.

1909: By 1909, Aboriginal inventor, David Unaipon, had developed and patented a modified handpiece for shearing. Between this year, and 1944, he made patent applications for nine other inventions, including a centrifugal motor, a multi-radial wheel and a mechanical propulsion device, building his reputation as “Australia’s Leonardo da Vinci” (Biography - David Unaipon - Australian Dictionary of Biography (anu.edu.au))

1974: Despite historical inequalities and inequities experienced by Aboriginal and Torres Strait Islander students in mainstream Australian education systems, Sydney Technical College first began to offer technical education courses as vocational training for Aboriginal students without their School Certificate qualification. Courses in engineering trades and home science were offered, as well as classes in expression, Aboriginal cultures and industry

1980: The Centre for Appropriate Technology (CAT) was established, growing to become a peak national Indigenous science and technology organisation.

1983: Balarinji is established by John and Ros Moriarty (explore the Balarinji art and design collection at the National Museum of Australia)

1995: Image of Aboriginal inventor, David Unaipon, was first printed on the Australian \$50 note.

2007: The first Puliima National Indigenous Language and Technology Forum—a biennial event aimed at bringing people together from all over Australia and internationally to explore pioneering project ideas and exciting technical products and equipment that can be used in community based Aboriginal and Torres Strait Islander languages projects— was held in Newcastle, NSW.

2013: Supported by Telstra, IDX launched an inaugural Indigenous Digital Agenda (IDEA) Summit at the National Centre of Indigenous Excellence (NCIE) in Redfern.

2014: CSIRO launched its Indigenous STEM Education Project, recognising the important contributions that Aboriginal and Torres Strait Islander peoples can make to the future of the science, technology, engineering and maths industries in Australia.

2016: Archaeologists discovered part of the world’s oldest axe in a remote corner of the Kimberley, evidencing the longstanding ingenuity of Aboriginal and Torres Strait Islander peoples and the sophistication of Aboriginal and Torres Strait Islander design and technologies throughout history.

- INDIGI LAB was founded with a vision to create a future where Aboriginal and Torres Strait Islander Australians are leading in science, technology and digital innovation. It also launched Australia’s first Aboriginal and Torres Strait Islander Science and Technology magazine, STREAMS IQ.
- The CSIRO launched its inaugural Indigenous STEM Awards. - The inaugural National Indigenous Digital Excellence (IDX) Awards were launched, with a mission to uncover everyday digital excellence and inspire Indigenous entrepreneurs, businesses and young people.
- Prime Minister Malcolm Turnbull made a commitment at the Indigenous Digital Excellence Summit to “fund the best technological solution to achieve an improvement in education outcomes.”

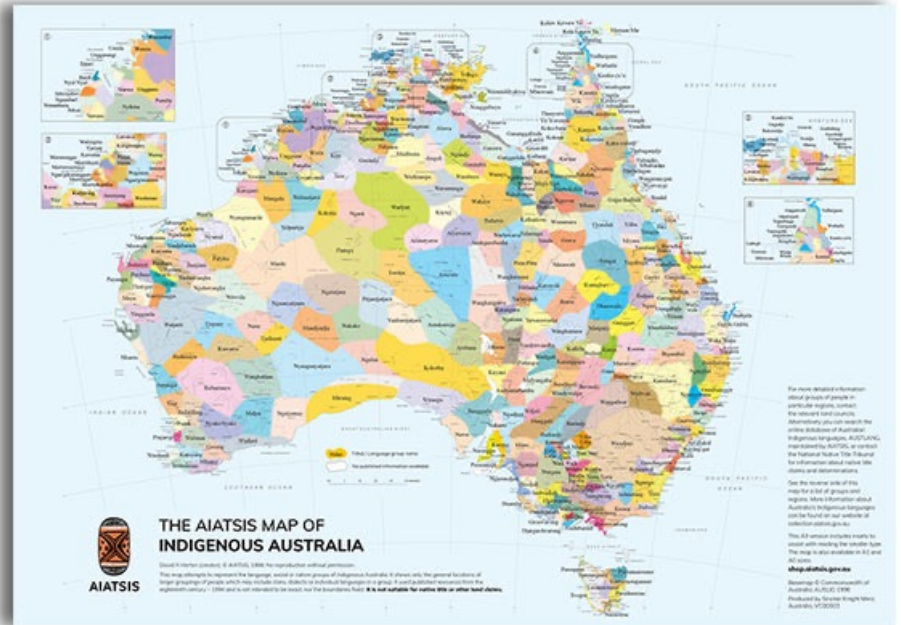
2017: A new Multimedia Award is included as part of the Telstra National Aboriginal and Torres Strait Islander Art Awards to recognise the contributions of Aboriginal and Torres Strait Islander digital artists.



MAP OF INDIGENOUS AUSTRALIA

REFERENCE: *Map of Indigenous Australia* | AIATSIS corporate website <https://aiatsis.gov.au/explore/map-indigenous-australia>

This map attempts to represent the language, social or nation groups of Aboriginal Australia. It shows only the general locations of larger groupings of people which may include clans, dialects or individual languages in a group. It used published resources from the eighteenth century-1994 and is not intended to be exact, nor the boundaries fixed. It is not suitable for native title or other land claims. David R Horton (creator), © AIATSIS, 1996. No reproduction without permission.



ABORIGINAL AND TORRES STRAIT ISLANDER DESIGNERS, INVENTORS AND TECHNOLOGISTS

Engineering is about process, and the process of engineering was very different in Australia before the English colonised the land. For many millennia, Indigenous Australians have engineered the landscape using sophisticated technological and philosophical knowledge systems in a deliberate response to changing social and environmental circumstances. These knowledge systems integrate profound understanding of Country, bringing together an understanding of the topography and geology of the landscape, its natural cycles and ecological systems, its hydrological systems and its natural resources, including fauna and flora. This has enabled people to manage resources sustainably and reliably.

HUMAN-CENTRED VS COUNTRY-CENTRED DESIGN

Prioritising people and their needs when designing is widely regarded as fundamental in contemporary design and planning. However, appreciating an Indigenous or Aboriginal world-view suggests that there are limitations imposed by an entirely human-centred approach to design. If people and their needs are at the 'centre' of design considerations, then the landscape and nature are reduced to second order priorities. If design and planning processes considered natural systems that **include** people, animals, resources and plants equally – similar to an Aboriginal world view – this could make a significant contribution to a more sustainable future world.



Ego-centric v Eco-centric diagram
adapted from Art Tawanghar, Designer, San Diego (2016)

REFERENCE: *Designing with Country* (aidr.org.au)

The lists below include some examples of Aboriginal and Torres Strait Islander designers, inventors and technicians who have played, and/or continue to play, a key role in the design and technologies and digital technologies fields. Given the interrelationship between Aboriginal and Torres Strait Islander technologies, the wider STEM field, and other subject/learning areas, you may also consider engaging with the lists of Aboriginal and Torres Strait Islander contributors included in a number of the other subject-specific resource guides:

DESIGN AND TECHNOLOGIES

- Alison Page
- Andrew Lane
- David Unaipon
- Dillon Kombumerri
- Lucy Simpson
- Lyn-Al YoungMick Davis
- Rhys Thomas
- Will Morgan

DIGITAL TECHNOLOGIES

- Celeste Carnegie
- David Williams
- Luke Briscoe
- Luke Pearson
- Marcus Lee
- Mikaela Jade
- Rae Johnston
- Tyson Mowarin
- Zoe Betar

ORGANISATIONS/PROGRAMS

technologies-design-technologies-and-digital-technologies-resource-guide-f8b116ab41.pdf (narragunnawali.org.au)

REFERENCE LIST:

<https://www.vcaa.vic.edu.au/VCAAProfessionalLearning/ProfessionalLearningPrograms/VCE/Pages/IndigenousDesign.aspx>

Bruce Pascoe: Aboriginal Agriculture, Technology and Ingenuity - ABC Education

5 Indigenous engineering feats you should know about | SBS NITV

Designing with Country (aidr.org.au)

Bandalang Studio advocates for Indigenous systems design | ANU School of Engineering

technologies-design-technologies-and-digital-technologies-resource-guide-f8b116ab41.pdf (narragunnawali.org.au)

ADDITIONAL REFERENCES:

Indigenous Design Charter (<https://indigenousdesigncharter.com.au/>)

Hall of Fame (<https://www.visiblesteps.com/home/2016/9/23/indigenous-designers-inducted-into-dia-hall-of-fame>)

Teaching First Nations Perspectives (<https://cultureislife.org/education/resources/teaching-first-nations-knowledges-perspectives/>)

Podcast (<https://www.sbs.com.au/language/english/en/podcast-episode/what-is-the-cultural-significance-of-first-nations-weaving/ey5wv6fm3>)

Professional learning (<https://www.vcaa.vic.edu.au/VCAAProfessionalLearning/ProfessionalLearningPrograms/VCE/Pages/IndigenousDesign.aspx>)

Stories (<https://ewb.org.au/stories-of-indigenous-engineering/>)

Koorie Perspectives in STEM (<https://www.vaeai.org.au/wp-content/uploads/delightful-downloads/2019/06/Koorie-Perspectives-in-STEM-special-feature.pdf>)

8 ways (<https://www.8ways.online/>)

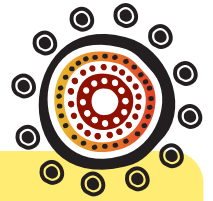
Cultural Engineering (https://deadlystory.com/page/culture/Life_Lore/Science/Engineering)

Indigenous Fashion (<https://www.vogue.com.au/fashion/trends/14-first-nations-fashion-designers-and-studios-to-know-now/image-gallery/8f6fcee1cff25f8034a9f0b4881bea1e>)

TED Talk (https://www.ted.com/talks/manu_peni_the_sustainable_brilliance_of_indigenous_design?subtitle=en)

TASK DESCRIPTION – CULTURAL CONNECTION

For this task students will work in groups or pairs to complete one of the following research tasks:



- Research an Aboriginal and/or Torres Strait Islander Designer, Inventor or Engineer. What is the importance of his or her contributions to design and technologies, or digital technologies, on either a local or (inter)national scale?



OR

- Research an Aboriginal and/or Torres Strait Islander technological invention or innovation. What is the historical or continuing significance of this innovation? What positive impact has it had on the design and technologies or digital technologies industry at the local or (inter) national level? Has it had a positive impact on wider subject, learning or industry areas?

Each group will give a multimodal presentation to their peers that showcases the importance of the design or designer and the impact of this design on society today.

Students are to use their research to prepare and deliver a speech and accompanying digital media presentation. The presentation must be **5 minutes** and should include the following:

- An introduction to their chosen Aboriginal and/or Torres Strait Island designer or technological invention.
- A short overview of the design, the emerging innovation, the impacts and efficiency of the design
- Connection to other design/designers in society today
- The reach of the design. Is it national? International?
- The positive and/or negative impact they have, or the design has, on the design and technologies or digital technologies industry.
- Have they, or has the design, had a positive impact on the wider subject, learning or industry areas?
- A personal reflection on what they have learned through the process of researching and preparing for their presentation.

The digital media presentation component of this task may take the form of a PowerPoint presentation, a Google Slides presentation, a Prezi, a Wiki, a vlog, a short film, or any other form negotiated with the classroom teacher. The presentation files and a transcript of the speech must be submitted on the due date.

Students will also be required to submit a resource list for the class that outlines the websites where they examined their research.



CULTURAL CONNECTION (PEER ASSESSMENT RUBRIC)

Students:

ABORIGINAL OR TORRES STRAIT ISLANDER DESIGN OR DESIGNER:

Category	Excellent (9/10 pts)	Very Good (7/8 pts)	Satisfactory (5/6 pts)	Poor (3/4 pts)	Total
Originality of entire presentation	Presentation shows considerable originality and inventiveness	Presentation shows some originality and inventiveness.	Presentation shows an attempt at originality and inventiveness on a few slides	Presentation is a rehash of other people's ideas and/or graphic. Very little original thought.	
Effectiveness	Presentation includes all material needed to gain a comfortable understanding of the topic	Presentation includes most materials needed to gain a comfortable understanding of the topic, but lacks a few key details	Presentation is missing more than two key details required to allow for a comfortable understanding of the topic	Presentation is lacking many key details and is inaccurate in some parts	
Sequencing of information	Information is organised in a clear logical way. Students able to effectively follow information provided	Information is mostly organised in a clear logical way. Students able to follow information	Information is sometimes organised in a clear logical way. Students can grasp some information	Information is not organised clearly or logically. Students unable to follow information provided.	
Knowledge with understanding	Provides comprehensive information with a careful use of the correct terms and shows a sound grasp and understanding of the Design/Designer	Outlines relevant information using appropriate terms and develops a sound understanding of the Design/Designer	Describes information in simple terms and shows a tentative grasp and understanding of the Design/Designer	Shows little knowledge and understanding of the Design/Designer	
Conclusion and evaluation	Students state superficial conclusions showing tenuous links to presented outcomes	States tentative conclusions linked to the original outcomes. Some judgements are substantiated by the evidence and information collected. Simple evaluations of the investigation are outlined	Directly relates to original outcomes in reaching conclusions. Makes a critical appraisal of the assignment and may recognise limitations and difficulties to each destination without reaching definite conclusions	Lists some pros and cons to Design/Designer.	

Category	Excellent (9/10 pts)	Very Good (7/8 pts)	Satisfactory (5/6 pts)	Poor (3/4 pts)	Total
Delivery	The group holds attention of the entire audience with use of direct eye contact, seldom looking at notes. Students speak with fluctuations in volume and inflection to maintain audience interest and to emphasise key points	The groups is consistent is use of direct eye contact with audience, but they still return to notes. Students Speak with satisfactory variation of volume and inflection	Students display minimal eye contact with audience, while reading mostly from the notes. Students Speak in uneven volume with little or no inflection	Students hold no eye contact with audience, as entire report is read from notes. Students Speak in low volume and/ or monotonous tone, which causes audience to disengage	
Enthusiasm/Audience awareness	Demonstrates strong enthusiasm about topic during entire presentation. Significantly increases audience understanding and knowledge of topic; convinces an audience to recognize the validity and importance of the subject	Shows some enthusiastic feelings about topic. Students raise audience understanding and awareness of most points	Students show little or mixed feelings about the topic being presented. Students raise audience understanding and knowledge of some points	Students show no interest in topic presented. Students Fail to increase audience understanding of knowledge of topic	
Preparedness/Participation/group dynamics	All presenters knew the information, participated equally, and helped each other as needed. Extremely prepared and rehearsed	Slight domination of one presenter. Members helped each other. Very well prepared	Significant controlling by some members with one minimally contribution. Primarily prepared but with some dependence on just reading off notes.	Unbalance presentation or tension resulting from over-helping. Multiple group members did not participate. Evident lack of preparation and rehearsal. Dependence on notes.	