These series of lessons were created in collaboration with the teachers from

Unit Overview

Technology has paved the way for many new inventions, including technologies to support ocean and marine life. These sessions provide students with an opportunity to evaluate and investigate emerging technologies that are making a positive impact on our environment and climate.

Using information about these technologies, students will design a technology that will assist with supporting oceans and marine life. This can be drilled down to a specific animal, place or habitat or a general technology to support oceans. The focus is for students to connect the possibilities of technologies to support ocean life.

Session
'Session' has been used to define the order of tasks to complete the unit. It does not define a set time required to complete the task. Time allocated to complete a session is the teacher's discretion. This allows for flexibility for the teacher to drive the duration of the task and make modifications if necessary. Sessions can be merged into one set period or one session may run over multiple periods.

Australian Curriculum Alignment
The following sessions have been created using the Australian Curriculum: Digital Technologies Curriculum. Tasks may need to be modified to ensure state Digital Technologies Curriculum content descriptions and achievement standards are met. ACS has support and documents to help align this unit to other Digital Technology Curricular.

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Key Preparation

ACS Resources

Resources have been created to help teachers and students unpack and understand topics found within the Digital Technologies Curriculum. These give brief explanations of the topic and the expectations to teach the topic at the curriculum year level. It is intended the information is presented in a way that will set the foundation for further research.

- Ocean Clean Up Introduction Video: https://www.youtube.com/watch?v=II1VHaURRlA
  https://theoceancleanup.com/
- Sea Bin Project
  https://seabinproject.com/

Key Understandings

Students will:
- Investigate and define artificial intelligence and other technologies used to support ocean sustainability.
- Develop skills in using spreadsheet software programs to analyse and visual data.
- Design and evaluate a digital solution with the intention to support marine sustainability.

Key Questions

- How do we utilize technology in our everyday life?
- What technology is used to support marine sustainability and tackle climate change issues?
- How has technology been created to help climate change issues, especially those relating to oceans and marine life?
- Can the same technology we use in our everyday life be used to help marine life?
- What technology do you think would help our oceans and marine life?

Key Vocabulary

Artificial Intelligence, qualitative data, quantitative data, visual data functional, non-functional requirements, user experience, functionality, accessibility, usability, aesthetics, digital solutions, future risks, sustainability, innovation

Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
1.	Investigate how AI is being used to combat climate change issues	**Learning Intention** Students will identify and explain how AI and emerging technologies are used in their everyday life and helping with climate change issues. **Success Criteria** I can list how emerging technologies are currently used in everyday life.	Together list how technology is used in their everyday life. Group the technology into categories (e.g. social media, entertainment, learning, health. It is expected that more categories will be generated based on the types of technology identified by the students)	Read the ACS Information article: 'Can AI Save the Planet'. Revisit the list and look at technology with the lens of helping the reduction of climate change. Add any new technologies to the lists, with the possibility of adding a new categorising (assisting with climate issues)
Session Resources	**Student Resources**		**Teacher Resources** • [ACS Information Article 'Can AI Save the Planet'](#)	
2.	Evaluate how AI and other technologies are used to combat climate change issues	**Learning Intention** Students will investigate and evaluate technologies that are used to help climate change issues relating to oceans. **Success Criteria** I can evaluate technologies using a set criteria and question and statement prompts.	Read through page 11 'Fourth Industrial Revolution for Earth, Harnessing Artificial Intelligence for Earth'. Read through how technology is used to help the oceans. Refer back to the list made in the previous session. Add more technologies (and categories if applicable).	In small groups, students pick one of the articles and investigate how the technology is be used to help marine life and. They summarise the technology and evaluate the technology based on the criteria through prompt questions/statements. Provide students with a platform that will allow them to share their summaries and evaluations (students may refer back to this this in the following session).
Session Resources	**Student Resources** • [Incredibly accurate shark spotting drone keeping Aussie beach goers safe](#) • [Drones for helping monitor sea turtles](#) • [How Smart Boats Could Help Sole the Overfishing Crisis](#) • [Saving The Seas: New Technologies to Protect the Ocean](#) • [Technology Helps Fight Illegal Fishing](#) • [Saving Seas Turtles With High Tech Sensors](#)		• **Teacher Resources** • ['Fourth Industrial Revolution for Earth, Harnessing Artificial Intelligence for Earth', PWC, 2018](#) • [General articles about technology and helps marine scientists](#)	

Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
3.	Evaluating the utilisation of media to support marine life	**Learning Intention** Students will explore and evaluate how scientists are utilising social data (data collected from social media platforms). **Success Criteria** I can evaluate the advantages and disadvantages for using social media.	Together identify a range of common social media platforms that are used by the students. Discuss as a class the purpose of social media. Pose the question to the class – what other functions and purposes can social media be used? How can it benefit the wider community?	Provide students with the opportunity to read through the article 'Tweet Streams: How Social Media Can Help Keep Tabs on Ocean Health'. In small groups, students will choose another article to research and evaluate. In small groups, students will answer the question again. They will complete an evaluation for each platform they investigate.
Session Resources	**Student Resources** • Tweet Streams: How Social Media Can Help Keep Tabs on Ocean Health • https://towardsdatascience.com/how-to-use-data-science-for-social-impact-e9b272b1a4b3 • https://news.mongabay.com/2017/09/citizen-scientists-use-mobile-apps-to-green-the-ocean/ • https://www.americanscientist.org/article/social-media-monitors-the-largest-fish-in-the-sea • https://www.discoverwildlife.com/people/meet-the-scientist/monitoring-new-species-to-britain-through-social-media/		**Teacher Resources** • ACS Teacher Resource: Real World Problems • Social Media Evaluation Questions and Prompts • https://campus.sagepub.com/blog/what-is-social-data-science • https://www.sciencedirect.com/science/article/pii/S0006320718317609 • https://news.mongabay.com/2017/09/citizen-scientists-use-mobile-apps-to-green-the-ocean/ • https://tos.org/oceanography/article/science-outreach-using-social-media-oceanography-from-the-lab-to-the-public • https://www.frontiersin.org/articles/10.3389/fenvs.2015.00063/full	

Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
4.	Introduction to spreadsheets	**Learning Intention** Students will complete a set of activities that will increase their skill level when using spreadsheet programs. **Success Criteria** I can complete a set of activities that help me increase my knowledge and skills to use spreadsheet programs.	Introduce students to Excel. Allow them to explore the platform themselves without too much direction. Discuss with students the purpose of spreadsheet programs and identity functions the students have recognised while exploring the platform.	Students will complete a range of activities to upskills their knowledge and development of spreadsheet based software programs. Students are provided with a dataset specific to the skills to they will be learning throughout the series of lessons specific to spreadsheets.
Session Resources	**Student Resources** • Activities to master Spreadsheets		**Teacher Resources** • ACS Teacher Resource: Data and Information • ACS Teacher Resource: Data and Information Presentation • GCFLearnrfree.Org • https://www.digitaltechnologieshub.edu.au/teachers/lesson-ideas/integrating-digital-technologies/data-science-stem-resources	

Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
5.	Data analysis	**Learning Intention** Students will complete a range of activities to sort, analyse and present data. **Success Criteria** I can sort, manage and analyse the data to present insights and findings.	Together explore a dataset that was created through extracting data from social media platforms. Discuss with the class the types of techniques that students may use to analyse, interpret and present the data. Refer to skills they have acquired by completing spreadsheet activities.	Students are provided with a data set that was taken from a social media platform. They sort, manage and interpret the data to give a short presentation on the findings that have come from the social media dataset. Students are provided with a brief which explains the types of analysis they need to present to the class.
Session Resources	**Student Resources** • Data Analysis Brief		**Teacher Resources**	
6.	Design a new technology to support oceans and marine life.	**Learning Intention** Students will design a technology that will be used to support oceans and marine life. **Success Criteria** I can design a new social media platform that will collect data to help scientists gather social data to improve marine life and oceans.	Referring back to the evaluation of technologies and the list they have created, asks students to brainstorm new technologies or ways to improve current technologies.	In groups, students will use the information they have gathered over the previous sessions to create a new technology. The purpose of the technology is to assist oceans and marine life. This can be a physical hardware (an actual device) or software (app or program). To help with the process they will complete the Students Design Brief. They will use the design brief to guide their design and drawings.
Session Resources	**Student Resources**		**Teacher Resources**	

7.	Evaluation	**Learning intention** Students will evaluate their new design based on a set criterion of questions and prompts. **Success Criteria** I can evaluate my social media design by answering a set of questions and prompts.	Students will share their designs and ideas with their peers.	Students will independently complete an evaluation of their design for a new social media app. They will answer a set of questions and prompts to help them articulate the purpose of their digital solution.
Session Resources	**Student Resources** • Student Design Evaluation		**Teacher Resources**	

Existing Technology Evaluation		
Topic	**Questions**	**Evaluation**
Basics	What is the name of the technology? Who or what company was responsible for created it?	
Explanation	Explain the idea behind the technology. What is the primary function?	
Problem solving	What problem is the technology trying to help solve? What need is it meeting? Who are the stakeholders?	
Functionality	Briefly explain how the technology operates. What are the functional requirements (what are the must haves of the app to make it work)?	
Innovation	How is this innovative? How has the technology developed over time?	
Privacy and Security Requirements	What user information do they collect? What is their policy on keeping data secure? Has there been a breach of data?	

Social Media Evaluation Questions and Prompts	
Title	What's the tile of the of social media platform?
Use	What is it commonly used for? Such as content sharing, entertainment, gaming, live streaming
Short Description	Write a short summary of the platform and describe how a user interacts with the platform.
Data Collection	What data is collected? How is this benefiting the scientists? How was the data collected? Do they tell you what they were looking for and any key words they were searching for? Create a list of advantages and disadvantages for using social media to support data collection on marine life. How can it benefit the wider community?
Functional Requirements	What are the functional requirements (what are the must haves of the platform) to make it work? How are they using these requirements to gather data?
Meeting Needs	What need is the technology meeting? Why would this be important?
Innovative	How is this technology contributing to marine sustainability?
Sustainability	What social objective is it trying to achieve? How successful do you think that is?
Personal opinion	What rating would you give to use social media this way? Do you think it will be effective?

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Student Design Brief		
Topic	**Questions**	**Evaluation**
Explanation	What is the name of your technology idea?	
Problem solving	What problem do you want to solve for your user?	
Functional requirements	What do you want your product to do? What hardware/software do you need? What are their roles?	
Nonfunctional requirements	How would you keep data secure? How easy is it for the user to learn to use and manage the interface? What about response times?	
Privacy and Security Requirements	What potential issues could arise based on the data you are collecting and storing for your app?	
User Experience and Usability	Explain how the technology operates. How are the functions of the system interacting with the user? How does the user access information? How are you considering the aesthetics (colours, images and layout)? Any ideas on how you would like your screen to look? How will you move between screens? What will that function look like and where should it be placed?	
Possible issues	What issues could come up for your user? How can you stop those issues from happening? What issues do you need to consider when the user is using the technology?	