Managed Project, Term 1, 2023

NATURAL DISASTERS Teacher Guide

Overview

This term, our Challenge Course investigates natural disasters; what they are, different types of natural disasters, how they impact on the Earth and living things and how people can prepare for and manage the impact of natural disasters. Students are guided through a Design Thinking process as they learn about the strategies and technologies used by scientists, engineers and emergency service workers to prevent and manage the effects of natural disasters. Students will then design a solution to help prevent or minimise the impact caused by a natural disaster.

The **Natural Disasters** Challenge Course aligns with UN Sustainable Development Goals - #11 Sustainable Cities and Communities and #13 Climate Action

Managed Project Schedule

Prior to week 2

Watch 4 short webinars and set up ready to begin.

Week 2

Introduce students to Makers Empire 3D and complete in-app Basic Training tutorials.

Weeks 3 - 7

Teachers facilitate learning processes, with students using Makers Empire 3D to complete the in-app **Natural Disasters** Challenge Course.

Teachers attend optional Online Support Sessions on 28 February.

Teachers attend optional Online Support Sessions on 22 March.

Weeks 8 - 9

Students review designs and make final iterations before submitting their final design to teachers.

Teachers complete an online survey. The survey invites schools to select 3 top student designs for inclusion in an Online Gallery created by Makers Empire, following the conclusion of the Managed Project.



Components of Challenge Course

Videos: sharing key ideas and concepts

Quizzes and Pro-Training Design Tutorials: reinforcing key ideas and helping students to practice and apply new learning as they progress through the course

Design Thinking Project: drawing on developed knowledge and 3D design skills to create design solutions that help prevent or minimise the impact of a natural disaster

User Advice

The media contained in this Challenge Course includes content that shows images of natural disasters.

	Challenge Course Components
1	Video #1 - introducing the concept of natural disasters and different types
2	Quiz # 1 - related to the content in Video #1
3	Pro-Training Design Tutorial #1 –Volcano: Learn how to design a volcano model
4	Video #2 - exploring natural disasters that occur due to extreme weather
5	Quiz #2 - related to the content of Video #2
6	Pro-Training Design Tutorial #2 - House on stilts: Create a flood proof home
7	Video #3 - exploring natural disasters that occur due to sudden geological events
8	Quiz #3 - related to the content of Video #3
9	Pro-Training Design Tutorial #3 – The Earth's layers: Understanding the Earth's structure
10	Video #4 – learning about the people that help out when a natural disaster happens, the 'Natural Disaster Champions'
11	Quiz #4 - related to the content of Video #4
12	Pro-Training Design Tutorial #4 – Earthquake shelter: Protection against earthquakes
13	Video #5 - learning how to prepare for natural disasters to minimise the damage they cause
14	Quiz #5 - related to the content of Video #5.
15	Pro-Training Design Tutorial #5 – Emergency suitcase: Be prepared!
16	Design Thinking Project – to design a solution that helps to prevent or minimise the damage caused by a natural disaster
17	Reflect and Share - students sharing their thinking and communicating key features of their design solution

Alignment to Australian Curriculum

Learning Objectives:

- Students will develop an understanding of how sudden geological changes and extreme weather events can affect Earth's surface and the people and living things who inhabit it.
- Students will explore ways that scientific understanding can assist in natural disaster management to minimise their long and short-term effects.
- Students will learn about the important roles that governments, engineers, scientists, emergency experts and first responders play in minimising and preventing the damage and loss of life caused by natural disasters.
- Students will apply problem-solving and design thinking methodologies to develop a way to prevent or minimise the damage caused by a natural disaster.

Australian Curriculum Learning Outcomes:

The Challenge Course closely aligns to the following curriculum outcomes:

Technologies:

- Students recognise the role of people in design and technologies occupations and explore factors, including sustainability that impact on the design of products and services when meeting community needs. (ACTDEK010, ACTDEK019 - v8.4) (AC9TDE4K01, AC9TDE6K01 - v9)
- Students consider the impact of natural disasters on the design of constructed environments such as the structural design of buildings. (ACTDEK010, ACTDEK019 – v8.4) (AC9TDE4K01, AC9TDE6K01 – v9)
- Students critique needs and opportunities when designing a solution to prevent or minimise the damage caused by a natural disaster, including the development of design briefs and selection of appropriate materials, tools and systems. (ACTDEP014, ACTDEP024 – v8.4) (AC9TDE4P01, AC9TDE6P01 – v9)
- Students develop, modify and communicate design ideas to address an authentic problem or issue related to preventing or minimising the impact of a natural disaster. (ACTDEP015, ACTDEP025 v8.4) (AC9TDE4P02, AC9TDE6P02 v9)
- Students design accurate, innovative 3D models to scale using Makers Empire 3D modelling software. (ACTDEP016, ACTDEP026 – v8.4) (AC9TDE4P03, AC9TDE6P03 - v9)
- Students create prototypes of their design ideas and develop tests to assess the suitability of their project ideas. (ACTDEP016, ACTDEP026 -v8.4) (AC9TDE4P03, AC9TDE6P03 - v9)
- Students evaluate their designs against design brief criteria and respond to feedback from peers and teachers. (ACTDEP017, ACTDEP027 - v8.4) (AC9TDE4P04, AC9TDE6P04 - v9)
- Students work collaboratively to develop project plans and design solutions that meet the provided design briefs. (ACTDEP018, ACTDEP028 v8.4) (AC9TDE4P05, AC9TDE6P05 v9)



Science

- Students develop an awareness and understanding of how sudden geological changes and extreme weather events can affect Earth's surface. Students recognise that earthquakes can cause tsunamis. (ACSSU096 v8.4)
- Students develop an awareness of how scientific knowledge is used to solve problems and inform choices about where people live and how they manage natural disasters. (ACSHE100 v8.4)





More to Explore

Wanting students not to skim quickly over the Challenge Course, but taking the time to engage deeply in learning - reflecting, thinking critically and creatively, researching and questioning ideas, collaborating with others and extending their application of tools?

Below are some suggested online and offline strategies that could be built into the course to enrich learning and engagement and inspire innovative and thoughtful design solutions. Some of these **More to Explore** strategies have been shared by the amazing teachers already embedding Makers Empire and Challenge Courses into their learning programs and incorporating a range of strategies to promote intellectual challenge for students. You might adopt or adapt these strategies or use them as a springboard to innovate and design your own learning strategies that best meet your needs and context.

	Course	More to Explore
1	Video #1 What Are Natural Disasters?	Connect to personal experience: As a class, brainstorm what students already know and invite them to share personal stories about natural disasters. Adults can support students to reflect sensitively and safely on personal experiences. Imagery such as those provided on the previous page, can provide stimulus for discussion. Revisit video here: <u>Video #1</u>
2	Quiz #1	
3	Pro-Training Design Tutorial #1 Volcano	Teach each other: Students watch the tutorial with a partner and take turns to share new skills and areas where they are stuck. Students create their own training tutorials and use the 'Notes' feature to add instructions.
	Video #2	Research further: Students can visit <u>Scootle</u> or access
4	Extreme Weather Disasters	resources from the school or public library to find out more about natural disasters. Revisit video here: <u>Video #2</u>
5	Quiz #2	
6	Pro-Training Design Tutorial #2 House on Stilts	Recognise effort and skill development: The tutorials are scored on a combination of accuracy and number of mistakes. A student's accuracy score can be viewed in the Progress Report Tab within Challenge Courses on the Teacher Dashboard. Monitor student progress by clicking on the relevant cell in the table. Provide feedback via the three vertical dots on the right-hand end of the table and encourage students to redo the tutorial to improve their accuracy.
	Video #3	Research multiple perspectives: Students explore varying
7	Sudden Geological Events	perspectives on natural disasters, applying the <u>CRAAP</u> test to critically evaluate their information sources. The criteria can be modified for younger students.
		Whilst natural disasters can have devastating impacts, they can sometimes have positive benefits. Invite students to find



		fire can play in the germination of some Australian plants. Revisit video here: <u>Video #3</u>
8	Quiz #3	
9	Pro-Training Design Tutorial #3 The Earth's Layers	Encourage dialogue about learning : In this tutorial, students explore the basic controls in the app as they cut open the Earth's layers. Invite a few students to teach a new design skill to the class, highlighting where they got stuck and how they overcame challenges.
10	Video #4 Natural Disaster Champions	Empathise and ideate: As a class or as individuals, students interview someone who has experienced the impact of a natural disaster or someone who plays a role in assisting community before, during or after a natural disaster. Students design questions that assist them to understand the impact of a natural disaster and ways to minimise impact and prepare for danger. Revisit video here: <u>Video #4</u>
11	Quiz #4	
12	Pro-Training Design Tutorial #4	Online resources and support : Visit the Makers Empire <u>Free</u> <u>Resources</u> to find posters, guides and printables that may assist students with their learning.
	Earthquake Shelter	The Makers Empire 3D app Help articles can assist with trouble shooting issues: <u>Help Articles</u>
13	Video #5 What Can We Do About Natural Disasters?	Empathise and ideate: As a class, explore a community project that aims to educate and engage community members in preparing for and managing a natural disaster. The 'Pillowcase Project' is an example of a program aimed at building resilience in a disaster <u>Red Cross Pillowcase Program</u> . Revisit video here: <u>Video #5</u>
14	Quiz #5	
15	Pro-Training Design Tutorial #5 Emergency Suitcase	Applying skills: Invite students to consider how they might incorporate these tutorial design skills into their final design solution.
16	Design Thinking Project Design a solution that helps to prevent or minimise the damage caused by a	Revisit and discuss the iterative stages in the design thinking process. Students may choose to work collaboratively to research and record their learning at each stage using the Makers Empire one-page summary <u>Design Thinking Worksheet</u> Empathise: As a class revisit what students have learnt about natural disasters and their impact. Students may consider physical and psychological needs, the needs of people, places, or environments. A discussion around <u>Universal Design</u> <u>Principles</u> can support students to consider how their design might include the needs of all users.



		people play in minimising and preventing damage and loss of life. Investing time in clarifying the problem, can assist with a more successful and innovative solution.
		Adding design constraints can be one way to increase intellectual challenge for students.
		Ideate: Students generate and share many possible solutions to address the challenge. Starting from solutions that are already in existence can often be a springboard for new innovations. Encourage students to consider how they might solve the problem in a different way.
		Prototype: Engage students in a process to select their idea to prototype first. They may consider variables such as the most original idea, the idea they think will have most success or the idea that will benefit more end users. Students decide on a design solution to test. They may choose to sketch the idea on paper or build a model prototype with physical materials, first.
		Test: Invite students to use the 'Notes' tool to reflect on how well their design achieved its purpose, how effectively it met the design criteria and how they might change their design in further iterations to better meet the design criteria. Students may also seek feedback from peers and teachers.
		Allocate time for students to make design improvements based on feedback.
17	Reflect and Share	Reflect: Students work with a partner to reflect on the design process and communicate their thinking. Reflective questions could include: What did my first iteration teach me? How did I improve my design? What skills did I learn? What did I find hard and how did I overcome any challenges? What might I do differently next time? What am I left wondering about? How might I learn more?
		Remind students that you can see the time and effort put into their designs via the Progress Report tab on the Teacher Dashboard. The effort score is a complex algorithm based on the amount of time, editing and diversity of shapes and colours used by the student. Feedback and tokens can be provided.
		Bring designs to life: Students may choose to use the audio capability of the 'Notes' feature to add dialogue, narration or sound effects to designs. They may also like to use the augmented reality capability to visualise and test their 3D designs in authentic, place-based contexts. This feature can also assist students to present and pitch their design solution.
		Share designs: Invite students to share their own favourite designs to the class audience or in the global <u>gallery</u> , to inspire others and receive feedback. Students can browse designs and provide feedback.
		NB As a teacher you can decide on and assign the most appropriate privacy settings for your context via the Teacher Dashboard.



Email Communications

You will receive a weekly email from Makers Empire to support your involvement in the Managed Project. These emails will outline helpful information aligned to the schedule including:

- 1. Links to pre-recorded webinars explaining:
 - how to get your students started with Makers Empire and the Challenge Course
 - curriculum links
 - how to monitor and assess student progress through the course
- 2. Instructions on how to install the Makers Empire 3D app on school devices
- 3. Information about strategies to support student learning
- 4. Details on how to access support from the Makers Empire team
- 5. Survey links for teachers and students to provide insight into confidence levels, learning behaviours and attitudes

Online Support Sessions

Two, optional Online Support Sessions will be facilitated throughout the term to support your involvement with the Managed Project.

Dates:

Tuesday 28 February, 4:30pm - 5:15pm AEST (4:00pm - 4:45pm Adelaide time) FOCUS: Design Thinking to promote deep engagement and learning – what's working, asking questions, sharing and learning from each other <u>Zoom Session Link</u> Meeting ID: 8817456 2949, Passcode: 986234

Wednesday 22 March, 4:30pm - 5:15pm AEST (4:00pm - 4:45pm Adelaide time)

FOCUS: Assessment tools, 3D printing and virtual showcase Zoom Session Link Meeting ID: 848 9082 0078 Passcode: 626824

The timeslot has been selected to best accommodate national attendance. If the timeslot is not suited to your time zone, please make contact and we can arrange an alternative session.

Additional 30 minute online zoom calls can be facilitated as the need arises. Just contact us at info@makersempire.com to book a date and time.

Ordering Prints through MakeShop

Did you know that you can save time and order professional 3D colour prints through the Makers Empire MakeShop? These can be printed in various sizes and colours and from a number of materials. Learn more here: <u>MakeShop</u>



Need a hand?

Contact us any time at info@makersempire.com

