

# Muinín Catalyst STEAM Education for Sustainable Development and Futures Literacy

## Climate Change Engage Game Design



### UNIT FOCUS: DESIGNING SERIOUS GAMES FOR CLIMATE CHANGE ADAPTATION AND AWARENESS

Subject AREAS: Design, Environmental Science, Game Design, Geography, Science, Technology

<b>4</b> QUALITY EDUCATION 	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	<b>11</b> SUSTAINABLE CITIES AND COMMUNITIES 	<b>12</b> RESPONSIBLE CONSUMPTION AND PRODUCTION 
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# SDG13 Climate Change Engage Game Design



## SDG13 Climate Change Engage Game Design

**Subjects: Science, Design, Game Design, Geography, Environment, Technology, Sustainability**

Climate Change Engage introduces learners to the topic of game design within the context of climate adaptation. It introduces them to the concept and process of Design Thinking; the cognitive, strategic, and practical processes for creative problem-solving. The module enables learners to develop a fundamental understanding of serious game design, world-building, character development, presenting, planning and time management.

The module encourages learners to engage with their local context to enable them to explore real-world problems in meaningful and tangible ways that are manageable. The module encourages the development of 21st Century skills, supporting them to keep up with the lightning pace of a constantly changing technologised world.

Design Thinking helps the learners to understand that they can create their own future by enabling them to design their own experiences and participation. Using linked learning and systemic thinking with practical methods of learning, including inquiry and project-based methods, the activities support teachers and learners to undertake a serious game design project.

### **In this module, the learner will...**

- gain knowledge about climate change adaptation, mitigation, nature based solutions, and environmentally sensitive design
- develop awareness of the basics of Design-Thinking for problem-solving
- practice problem solving and critical thinking skills as individuals and as part of a group
- be introduced to aspects of serious game design and tools such as Lean Canvas, vision boards and a Pecha Kucha presentation
- develop skills of planning, division of workload and time management

### **This module includes:**

- Lesson plans
- Accompanying resources
- Project-specific worksheets related to specific goals and other project modules
- Optional assessments
- Skill support resources

**4** QUALITY EDUCATION



**9** INDUSTRY, INNOVATION AND INFRASTRUCTURE



**11** SUSTAINABLE CITIES AND COMMUNITIES



**12** RESPONSIBLE CONSUMPTION AND PRODUCTION



# SDG13 Climate Change Engage Game Design



## Climate Change Engage Game Design – Module Overview

### Lesson 1: What is Design Thinking?

Design Thinking is the cognitive, strategic and practical process for creative problem-solving. This lesson will introduce students to the 5 stages of Design Thinking to build a foundational understanding of the process.

Resources include: Worksheet: Introduction to Design Thinking, Flipped Classroom: Learning about Complexity

### Lesson 2: What is Climate Change?

In this lesson, learners are introduced to the foundational concepts of climate change including the difference between weather and climate. This enables learners to understand more about climate change, its impacts and gain knowledge that they can include within their game design.

Resources include: Video: What is climate change part 1 and 2, Worksheet: Discussion Questions and Infographic: Impact of 2C vs 1.5C Support: Teachers Guide

### Lesson 3: The Cause of Current Climate Change

In this lesson, learners are introduced to the current causes of climate change. Through an exploration of the process of energy transport (radiation), the relationship between greenhouse gases and how heat is trapped, learners develop awareness on the causes of global warming and how this contributes to contemporary climate change.

Resources include: Video: The Cause of Current Climate Change, Infographic: Infographic: Impact of 2C vs 1.5C

### Lesson 4: Climate Change Engage

In this lesson, learners are introduced to the concepts of mitigation and adaptation, and identifying opportunities for learners to take climate action by looking at their own behaviour and how they might reduce their impact.

Resources include: Video: Climate action- part 1-mitigation, Video: Climate action- part 2-adaptation, Support: Climate Mitigation Chart, Support: Climate Game Themes

### Lesson 5: Design Thinking 1 - Empathy

Stanford Design School's five-chairs exercise is adapted to encourage learners to learn how to develop design principles for a gamer profile. Learners will consider the gamers' needs and develop ideas on paper and create 3D prototypes of their designs.

Resources include: Worksheet: Gamer's profiles

# SDG13 Climate Change Engage Game Design



## Climate Change Engage Game Design – Module Overview

### Lesson 6: Design Thinking 2 - Defining the Problem 1

In this lesson, learners will begin to understand how to define a problem. Learners are asked to begin to identify the problem they want to address within their game design using the driving question and SDGs as a starting theme. They also have an opportunity to develop an awareness of the problem on a local scale.

Resources include: Flipped Classroom Task: Define the Problem, Video: Defining the Problem, Worksheet: Problem Tree

### Lesson 7: Design Thinking 2 - Defining the Problem 2, Deconstructing Parts of a Game

Through deconstructing games, learners will develop their understanding and knowledge of different kinds of games and game construction. This lesson enables learners to gain insight into game design; their mechanics and purpose, which provides a foundation for them to construct inclusive games.

Resources include: Worksheet: Deconstructing Games, Worksheet: Game Evaluation, Worksheet: Game Review Sheet

### Lesson 8: Design Thinking 3 - Ideate 1, Worst Game ever

This lesson enables learners to develop an understanding of the importance of developing ideas and looking for opportunities to iterate and improve on existing ideas. Learners are also introduced to Open Source concepts e.g. iteration and collaboration.

Resources include: Teacher Support Sheet: Worst Game Ever

### Lesson 9: Working with Nature: Nature-Based Solutions & Green Infrastructure

This lesson introduces learners to the closely associated concepts of 'nature-based solutions' and 'green infrastructure'. The lesson challenges them to rethink how and why the places they are familiar with could and should be redesigned.

Resources include: Video: 'Nature-Based Solutions & Green Infrastructure', Flipped Classroom: Vocabulary & Case Studies

### Lesson 10: Working with Nature: Nature-Based Solutions & Green Infrastructure

This lesson builds on Lesson 9 and involves rethinking how we design the places where we live, work, and play. The lesson deepens the learners' understanding of key concepts and terminology presented in lesson 9.

Resources include: None required

### Lesson 11: What are Serious Games?

This lesson introduces learners to what serious games are and their purposes, describing the characteristics of games relevant to integrating nature in cities.

# SDG13 Climate Change Engage Game Design



## Climate Change Engage Game Design – Module Overview

Resources include: Video: What are Serious Games? Worksheet: Active Listening, Support Sheet: Serious Games Directory (Istrate and Hamel, 2022)

### Lesson 12: Climate Change and the Built Environment (Part 1)

In this lesson, learners will learn why we need to adapt the way we plan and build our cities and towns in the future. Learners will consider the challenges of existing low-density settlements, how we can adapt and increase density in built-up area of cities and towns through repurposing buildings.

Resources include: Video: Climate Change and the Built Environment, Worksheet: Active Listening Task, Worksheet / Guide: Using AIRO Maps and Activity worksheet

### Lesson 13: Settlement Pattern and Sustainability

In this lesson, learners will reflect on the different settlement patterns in their locality and consider if they are positive or negative for the environment. Firstly, they review some of the key vocabulary / terms from the previous lesson and secondly, look at what these terms mean on the ground in the built environment that they are familiar with.

Resources include: Worksheet: Reviewing Vocabulary, Worksheet: Exploring Settlement Patterns, Reference: Appendix 1 and 2

### Lesson 14: Housing Types, Density and Climate Change.

In this lesson, learners will think about different types of housing, their varying densities and how sustainable these are. They will think about the various types of housing they are aware of and reflect on the positive and negative elements of these from a climate change perspective. This lesson focuses on different building types rather than overall settlement.

Resources include: None required

### Lesson 15: Defining the challenge (driving question) & forming teams

In this lesson, learners will begin to consider the key aims of the project and forming teams. In order to come up with a well-rounded pitch, it is important to answer the driving question in full. By breaking down and analysing each part of the question, learners have a more focused approach to their research, ideas and solutions.

Resources include: None required

### Lesson 16: Mapping the User

This lesson facilitates learners to develop further insight into specific users and develop an understanding of their needs and interests. From this lesson, learners working within their design teams will begin to identify and focus on the users of their game and the design principles, necessary to design their game.

# SDG13 Climate Change Engage Game Design



## Climate Change Engage Game Design – Module Overview

Resources include: Worksheet: Stakeholder Mapping, Worksheet: Gamer Journey Map, Worksheet: ~ Understanding the User

### Lesson 17: Ideate 2 : Generating and Remixing Ideas

This lesson builds on Lesson 8, enabling learners to develop an understanding of the process of generating ideas using the fundamental components of a game. They will work in teams to identify 4 components of 3 games building on their understanding of games from Lesson 7 and how to use random variables to create useful building blocks for design ideas.

Resources include: Worksheet: Ideate Remix, Worksheet: Remix SWOT

### Lesson 18 - 20: Developing Designs on Paper and Building Prototyping Skills

In this lesson, learners will begin to consider their ideas for their prototype, develop a concept statement and look at ways to prototype their ideas depending on their gamers / audience. They will also develop their designs on paper using their user profiles and selected game theme. They will also begin to prepare materials and ideas for their vision board.

Resources include: Video; Design Thinking - Prototyping, Worksheet: Concept Statement. Worksheet: Rapid Response prototyping (incl. Rapid Response Ready, Set, Design

### Lessons 21- 22: Design Thinking - Test 1 Creating and Using Vision Boards

This lesson prepares learners to present their work in a structured way and prepares them for organising documentation (images, details) of their idea development and process. This lesson will begin to help them test their ideas by developing their vision boards using the Vision Board support worksheets and prepare them for their final pitch - their Pecha Kucha presentation.

Resources include: Worksheet: Vision board, Support: Creating a Game Vision board

### Lessons 23 - 26: Creating your 3D prototype - Self-directed Making

In these sessions, learners build on lessons 14 - 21, to develop their initial paper prototyping ideas, receive feedback from testing their ideas to create their final game prototype and complete their vision boards in preparation for their pitch presentation.

### Lesson 27: Peer Assessment - Developing Pitch Criteria

In this lesson, learners will define their peer assessment criteria. Peer assessment enables those directly involved in the task or project to appraise their own learning. Learners are encouraged to consider what is most important, valuable and successful from what has been learned and the process of learning; taking responsibility, learning to evaluate, increasing motivation and practicing giving and receiving feedback.

Resources include: None required

# SDG13 Climate Change Engage Game Design



## Climate Change Engage Game Design – Module Overview

### Lesson 28: Design Thinking Test 2 Preparing to Pitch - Pecha Kucha 1

In this lesson, learners will be introduced to the Pecha Kucha format and begin to analyse what makes a good presentation so they can prepare to create their own Pecha Kucha presentation.

Resources include: Video: A Pecha Kucha About Pecha Kucha, Video: Bad Presentation 1, Video: Bad vs Good Presentation, Worksheet: Pecha Kucha Analysis

### Lesson 29 - 30: Design Thinking Test 2 Creating a Pecha Kucha

In this lesson learners will continue how to plan, create and present their Pecha Kucha. The lesson and its resources support students to create their outline and begin to develop their presentation step-by-step. They can continue to work on this in lesson 30.

Resources include: Worksheet: Pecha Kucha Planning Guide, Worksheet: Pecha Kucha Outline, Worksheet: Pecha Kucha Checklist

### Lessons 31 - 32 Design Thinking Test 2 Peer Review and Pitching Your Ideas

This lesson builds on Lessons 27 - 30 by enabling learners to develop their presentation skills, learn to give peer feedback and constructive criticism. Each team will present their game ideas to the other teams and using the supporting resources assess their peers.

Resources include: Support Resource: Peer Review table

### Lesson 33: Facilitating a World Café

In this lesson, the learner will experience the World Café methodology as a reflective tool. A World Café is a series of conversations around a question or issue. It was developed in 1995 and is a simple, flexible and effective way to host large group dialogue. By facilitating a World Café as a reflective exercise for your learners, it will enable them to process their thoughts on the game design process and feedback further on each others' game ideas.

Resources include: Support resource: Facilitating a World Café

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# SDG13 Climate Change Engage Game Design



## Climate Change Engage Game Design – Module Overview

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### Setting up an online learning environment for the lessons on this module:

Our lessons integrate the use of virtual learning environments. To ensure seamless use of our lessons, a module should be setup on your school's virtual learning environment such as Teams, Google Classroom, etc. Learners are encouraged to upload documents to share with their peers. If your virtual learning environment does not support document sharing, we recommend OneDrive or Google Drive.

You can also use Google Sites or Microsoft Sway to encourage learners to present their work over the year - this can easily be set up to reflect the aims of TY and provide a showcase for their work as well as assessment tool.

### Setting up a Canva Education account:

As our lessons integrate design, our lessons also refer to Canva. Educators and schools are able to open a free Canva for Education account by registering here:

<https://www.canva.com/education/> Canva for Education provides primary and secondary school teachers and students with premium features and templates. You can then also set up lessons and invite your learners to the class.



# SDG13 Climate Change Engage Game Design



## Climate Change Engage Game Design – Module Overview

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# SDG13 Climate Change Engage Game Design



## Climate Change Engage Game Design – Module Overview

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# SDG13 Climate Change Engage Game Design



## Climate Change Engage Game Design – Module Overview

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# SDG13 Climate Change Engage Game Design



## Climate Change Engage Game Design – Module Overview

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# SDG13 Climate Change Engage Game Design



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