SDG13 Climate Change Engage Game Design

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

Subjects: Design, Environmental Science, Game Design, Geography, Science, Technology

Lesson Title and Summary: Developing designs on paper and building prototyping skills

In these lessons, 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.

Vocabulary: Concept Statement; Enterprise; Innovation; Prototype

In this lesson, the learner will:

- explore how to evolve ideas
- iterate their ideas
- develop a concept statement
- explore prototyping methods using paper and card
- develop prototyping skills

Materials

- Worksheet: Rapid Response Prototyping
- Worksheet: Concept Statement
- Video: 'Design Thinking - Prototype'
- Pens, pencils
- Paper and card
- Internet Access

Activity Instructions

Lesson 18 Activity 1 Prototyping – Rapid Response (10 mins)

1. Watch Video: 'Design Thinking: Prototyping'
2. Discuss the benefits of prototyping.

Activity 2 Creating a Concept Map (20 mins)

1. Review Worksheet: Concept Statement to ensure task understanding.
2. Ask learners to complete a concept statement for their game.

   - *Learners focus on their game and its selected problem area e.g. climate adaptation. Using their empathy maps and the project's driving questions learners will create a concept statement. It is important that learners document this process as they will use images in their vision board and Pecha Kucha lessons.*

Activity 3 Developing your Prototype (20 mins)

1. Ask learners to complete page 1 of Worksheet: Rapid Response Prototyping
2. Ask learners to begin developing their designs on paper using their concept statements.

Lesson 19 Developing your Prototype

1. Using pages 2 - 4 of Worksheet: Rapid Response Prototyping, ask learners to complete one of each of the elements of construction.

   Learners can watch the videos at home as a flipped classroom or together in class

Lesson 20 Completing your Prototype

1. Learners use this lesson to complete their paper game designs and a paper prototype

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REFLECTIVE EXERCISE: 3-2-1 (10 mins)

- Three things they feel they have learnt from the tasks
- Two things they found most interesting and would like to explore more
- One opinion they have about the activities, what did they like or how they would improve them

Use Post-its or a mentimeter survey - www.mentimeter.com to gather reflections

EXTENSION / REDUCTION ACTIVITIES

Reduction: For a shorter class, divide the tasks in Lessons 18 - 20 across more lessons. Set some of the worksheet tasks as Flipped Classroom tasks.

Extension: For a longer class, extend the prototyping tasks to begin the work on their 3D prototype

Learners can also take part in a Ready Steady Design challenge - see the video in the Media Box and P5 Rapid Response Prototyping worksheet - Ready Steady Design Challenge.

MEDIA BOX: (materials, online video links, extra resources, case studies etc)

'Design Thinking: Prototyping' (4:54mins) https://www.youtube.com/watch?v=Q4MzT2MEDHA

'What is a Prototype?' (4:11mins) https://www.youtube.com/watch?v=4XenqN5Ib9o

'Paper Prototyping' https://www.youtube.com/watch?v=85muhAaySps

'Rapid Prototyping' (7:31min) https://www.youtube.com/watch?v=JMjozqJS44M

'Ready Steady Design' (3:26min) https://www.youtube.com/watch?v=jIXSuZg2awA&feature=emb_logo

This and the following lesson links to lessons 21 - 22 and 28 - 29 to guide learners in consolidating and presenting their ideas, while learning presentation and communication skills.

Local Trip / Expertise / Additional Work and Assessments

Contact Game designers to host an online talk/in-person visit to talk about their design process.
- Research iForm, National Research Centre in Advanced Manufacturing at University College Dublin - https://www.i-form.ie
- Arrange a meeting or presentation with their community engagement and education team about rapid prototyping https://www.i-form.ie/communityengagement/overview/

Arrange a visit to a local engineering company or manufacturing company to find out more about product design and their prototyping process.

CCE L18WS: CREATING A CONCEPT STATEMENT

What is a Concept Statement?

A concept statement summarises a project's meaning, purpose, direction and depth. Concept statements are used at the beginning of the project planning stage. Within innovation and product development, the concept statement helps to focus ideas and keep the team on task.

Use the prompt boxes below to help your team create a concept statement for your game and its users.

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1. **Define the need in two sentences**

   You are developing a game for... Who? (tell us about your gamer). To do what? (This is the purpose of the game, include your specific theme / game focus).

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2. **The problem / issue - explain how your game concept will address the problem**

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3. **Gamer's needs - tell us about your gamer and their needs from a game**

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4. **Details- explain how your game's concepts meets this need**

CCE L18 – 20: RAPID RESPONSE PROTOTYPING

INTRODUCTION

Watch the following video: 'What is Design Thinking?'
https://www.youtube.com/watch?v=a7sEoEvT8l8

Answer the questions below. You can re-watch the video as many times as you need to.

a) What or who does design thinking help you focus on?

_____

b) How do design thinkers learn?   _____

c) What do simple prototypes do?   _____

d) What do rapid prototypes do?   _____

e) If you ideate, prototype and test too early - what are three mistakes
   that can be made?

_____

f) Write down the two reasons for using design thinking.

_____

g) What are the five stages of design thinking?

_____   _____   _____

_____   _____

Watch the video: 'How to make a cardboard prototype'
https://www.youtube.com/watch?v=k_9Q-KDSb9o Write down as many tips as you can.

# CCE L18 – 20: RAPID RESPONSE PROTOTYPING

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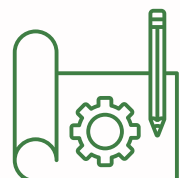
## READY, STEADY, BUILD: KNOWLEDGE GATHERING

Today we are going to experiment with rapid prototyping with materials that we have to hand. You will explore three basic elements - useful for rapid prototyping:

- Structure
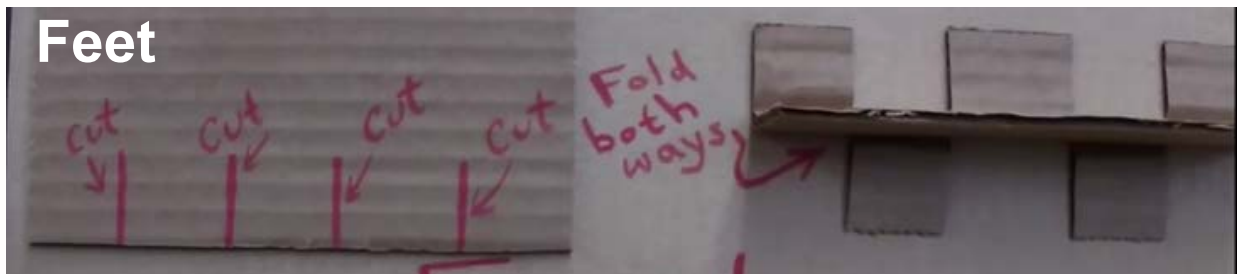- Fastening / Joining
- Surface

1. <u>Structure</u> - this will provide support and form to your prototype. The structure provides strength by load-bearing if re-enforced or solid e.g. columns or supports for covering or other materials e.g. tent poles. Here's some simple tips for creating structure.
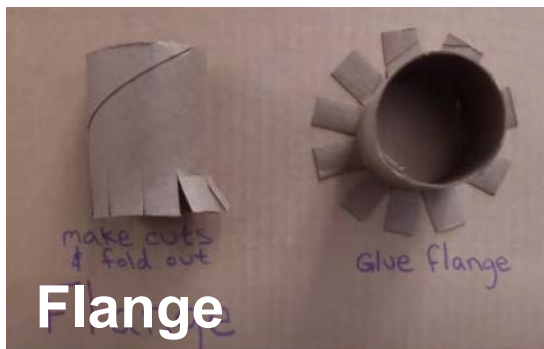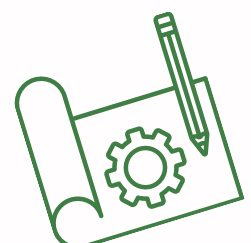

Flange
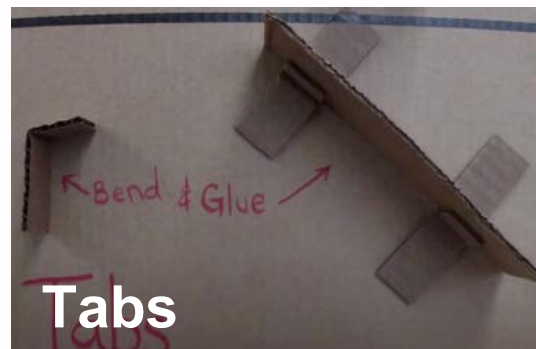
Tabs

Feet

Watch the short video on structural techniques - all these processes can be scaled up to make bigger models and forms.

Write down the key ideas in the video. Use bullet points.

Creating 3D sculptures https://www.youtube.com/watch?v=pi6Y7yCz7Y8

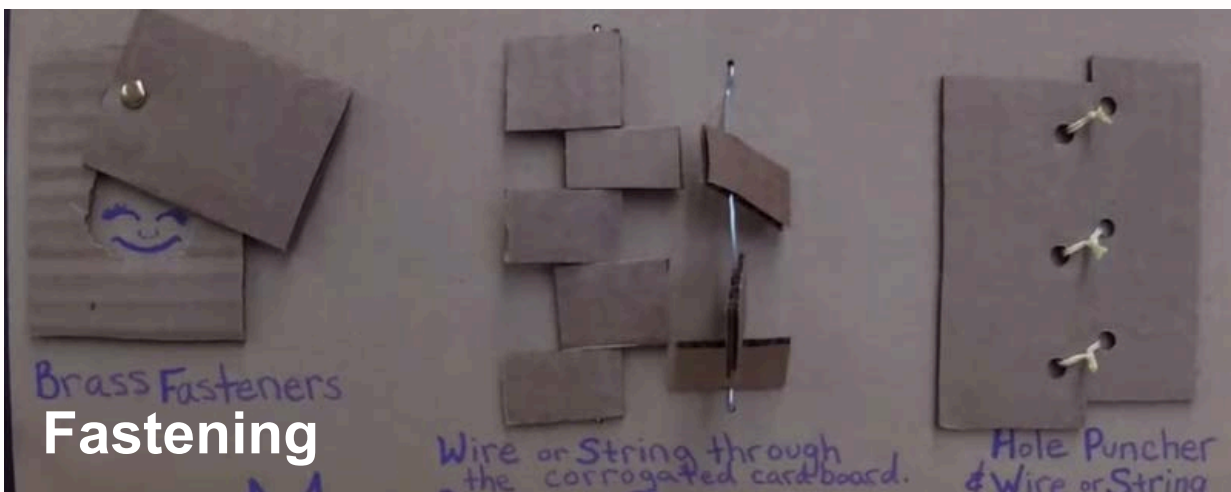# CCE L18 – 20: RAPID RESPONSE PROTOTYPING

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2. Fastening / joining and attaching - this can be done using structural approaches such at slots and tabs or using other materials like pins, paperclips, string tape or glue.

Tabs and Slots

Fastening

Brass Fasteners

Wire or String through the corrogated cardboard.

Hole Puncher & Wire or String

Some techniques can be both structural and used to join things together like the slots / tabs - here on the left.

What other ways do you know of joining things together? Discuss this in your group and make a list.

Knots are another useful joining technique- here's a useful website for learning to tie knots https://www.animatedknots.com/complete-knot-list

3. <u>A surface</u> - a surface has a number of functions, protection, decorative, textural, adhesive and are made from numerous materials e.g. plastic, wood, fabric, paper, both natural and synthetic.


Sometimes they can be structural as well as serving other functions. This surface material could provide support and be used as an attachment or joining function as well as offering a decorative purpose
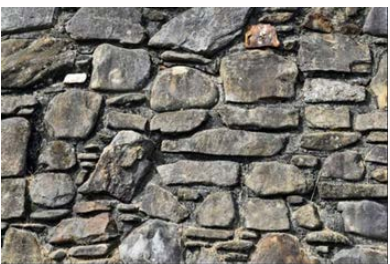
Natural materials often have other properties such as insulation, waterproofing, protection as well as being structural, making them good for outdoor construction.

Waterproof or those that are water repellent materials, (hydrophobic) are often inspired by nature, whether a rough surface that minimises water contact and absorption or the nanopatterns of insects who fly in the rain undisturbed. You can also treat materials with sprays to make them waterproof.
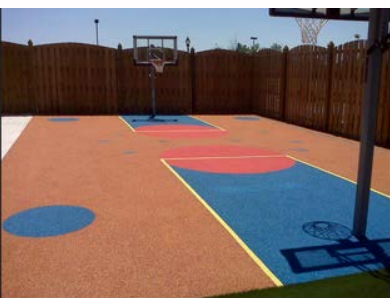
Safety surfaces can be both decorative and functional. They often use bright colours and recycled materials from other processes. They can be highly durable and so reduce maintenance

Interior design surfaces e.g. upholstery, curtains, wallpaper, bedding, worktops are increasingly synthetic and made from recycled materials e.g. SeaQual or Econyl from recycled fishing nets. They can be durable and easily cleaned and pleasurable to look at.

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READY, STEADY, BUILD: THE CHALLENGE

The Challenge:

1. Indoor activity- set by the teacher
2. Outdoor activity- selected from the list below in Challenge 2

The rules of the challenge:

1. 5 minutes to plan + 15 mins to build a prototype
2. You must include at least one material / object from each element

    - Structure
    - Fastener / Joiner
    - Surface

Challenge 1 (Indoor): Set by the teacher.

Challenge 2 (Outdoor):

Select one of the following challenges to complete in your team.

1. Create something to shelter from the weather - wind, sun, rain.
2. Create something to encourage more biodiversity or wildlife to the area.
3. Create a raised bed that stops animals eating what's growing but looks good and is interesting.
4. Create a table / seating that allows buggies, and wheelchairs to fit comfortably

Post-Challenge Discussion

Let's discuss each teams' design. Use these questions to help focus the discussion:

- How would you help them?
- What might be the next stage of the project?
- If this was to be developed, what are the issues that should be considered e.g. users' needs, surveys, market research?
- Is there anyone local that they could talk to if this was a real project?