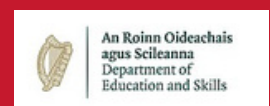# Muinín Catalyst STEAM Education for Sustainable Development and Futures Literacy

SDG8 The Future Of The Fashion

Unit focus: Problem to Pitch - STEAM Challenge

Subject Areas: Science, Design, Technology, Maths Environment, Sustainability

SDG4 Problem to Pitch

SDG4 Problem to Pitch

Subjects: Science, Design, Technology, Maths Environment, Sustainability

Problem to Pitch is a generic project-based learning module that can be adapted to any topic. It introduces students to the concept and process of Design Thinking; the cognitive, strategic and practical processes for creative problem solving.

The module encourages students 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 students to keep up with the lightening pace of a constantly changing technologised world.

Design Thinking helps the students 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 students to undertake projects that address contemporary issues on a local scale, in line with the Sustainable Development goals and the 2030 agenda.

In this module, the learner will...

- develop skills of organising, planning and scheduling
- develop awareness of the basics of Design-Thinking for problem-solving
- practice problem solving and critical thinking skills as individuals and part of a group
- be introduced to project management tools such as Lean Canvas, Logic models, 5Ws (who, what when, why where)
- Vision boards and a Pecha Kucha presentation

This module includes:

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

Problem to Pitch – Introduction to Design Thinking, Project Development and Management

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.

Worksheets include: Introduction to Design Thinking, Stakeholder Mapping, Flipped Classroom

Lesson 2: Empathy 1
Stanford Design School's five-chairs exercise encourages students to learn how to develop design principles for a user profile. Students consider the 5 users' needs and develop ideas on paper and create 3D prototypes of their designs. This activity encourages students to iterate on their designs and practice using different materials.

Worksheets include: User profiles worksheet, Empathy Map, Step into the Problem worksheet.

Lesson 3: Defining the Problem
In this lesson students will begin to understand how to define a problem. Students are asked to begin to identify a real problem they have wanted to address on a local or global level, using the SDGs as a starting theme. Students also have an opportunity to develop an awareness of a local problem

Worksheets include: Define the Problem support sheet, Problem Tree worksheet

Lesson 4: Ideate, Generating and Remixing Ideas
This lesson enables students to develop an understanding of the process of generating ideas starting with their personal experience and then moving into project themes.

Worksheets Include: Ideate Remix worksheet and Remix SWOT worksheet

Lesson 5: Ideate 2 Generating and Remixing Ideas 2.0 Good Idea / Bad Idea.
This lesson builds on lesson 4 and enables students to develop an understanding of the importance of developing ideas and looking for opportunities to iterate and improve on existing ideas. Students are also introduced to Open Source concepts e.g. iteration and collaboration.

Lesson 6: Prototype Your Idea
In this lesson students will begin to consider their ideas for prototyping, develop a concept statement and look at ways to prototype their ideas depending on their users / audience.

Worksheets Include: Rapid Response prototyping worksheet and Ready, Set, Design worksheet

Lesson 7: Test Your Idea
Evaluating an idea is a key aspect of Design Thinking. In this lesson students will begin the process of testing their ideas with potential users. Students will learn that this is not the end of the process and that they may learn something that means they might need to return to an earlier stage e.g. Define or Ideate.

Worksheets Include: 5 Ws of Business planning, 8Ws Business planning, Lean Canvas and Zone Map

Module development and expertise:
The Problem to Pitch module was developed during the CoDesRes project (McKeown et al, 2018 - 2021) by Dr Anita McKeown and has been adapted through the Muinín Catalyst project.

Using the Resources:
If you wish to use these resources, we can offer an induction and online support throughout the module to help you plan integration into your projects and timetable. To register for this option, please contact us e:hello@futurefocus21c.com

For more information on the resources please visit www.muinincatalyst.com

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.

SDG4 Problem to Pitch

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SDG4 Problem to Pitch

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SDG4 Problem to Pitch

Lesson 1 Introduction to Design Thinking

Subjects: Climate Action and Sustainable Development, Design, Technology, Science

Lesson Title and Summary: What is Design Thinking?

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

Vocabulary: Empathy; Context, Culture; Qualitative; Users; Stakeholders

In this lesson, the learner will:

- be introduced to Design Thinking
- explore the 5 stages of Design Thinking create their own understanding of the stages through quick practical tasks
- work as pairs and individuals to begin to
- understand the iterative processes
- practice time management

Materials:

- Worksheet: Introduction to Design Thinking
- Worksheet:Stakeholder Mapping
- Flipped Classroom Worksheet: Stakeholder mapping activity
- A4 paper
- Internet access

Activity Instructions

Activity 1 Introduction to Design Thinking (20 mins)

1) If working digitally ask learners to go to the worksheet: Introduction to Design Thinking in the learners download of this module. Alternatively this can also be projected or if necessary you can also circulate handouts and ask learners to keep all their work in a folder. This can be assessed at the end of the module, if you are undertaking assessments.

2) Activity 1, learners should complete the worksheet up to the section on titled - Define.
3) Begin by watching the short video Worksheet: Introduction to Design Thinking
3) Have learners work in pairs to find the definitions of the words and re-write them in their own words.
4) Have each pair share their meanings with the class, photograph each group's answers and use this to create a 'group' design thinking vocabulary list / glossary.
5) As a class, discuss the 5 stages of Design Thinking image – reviewing any terms that are new.

Activity 2 – Worksheet Part 2: Ideate - Good Idea / Bad Idea – (30 mins)

1) Allow learners 30 minutes to complete the Ideate and Prototype task of the Worksheet: Introduction to Design Thinking in pairs.
2) Remind them that they will have to manage their time to allow for the prototyping and testing stage.
3) The aim is not to create masterpieces but to work quickly and experimentally – it should be made clear that given the limitations, the purpose is to show how its important to quickly and cheaply *.
4) Have learners complete the Flipped Classroom worksheet before the next lesson.

3)* Explain to learners the purpose of prototyping is to enable feedback and input to their ideas as a user's needs or a client's desires can change a design radically and its important to not waste time and money during the early stages of design.

REFLECTIVE EXERCISE: 3-2-1 (5-10 mins)

- Three things they feel they have learnt from the tasks
- Two things they found most interesting and would like to explore more
- One – their opinion they have about the tasks

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

EXTENSION / REDUCTION ACTIVITIES

Reduction: For a shorter class, remove activity 2 and spend more time in building the collective vocabulary list – have each learner type up their words and definition and add to a shared document

Extension: For a longer class, give learners more time and materials for the Ideate – Prototype stages of Design Thinking.

Option B: Learners can also begin to think about their final project and how it relates to the Sustainable Development Goals highlighted on the lesson plans - see media box for links.

Option C: Learners can use the worksheet: stakeholder mapping to begin to consider their stakeholders and the local organisations that could be involved in a community wide event

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

- Introduction to Complex Systems: Patterns in Nature [7:51] https://www.youtube.com/watch?v=g5evD6AQeCQ&ab_channel=IlanaSchoenfeld
- Applying Design Thinking in Schools poster - https://www.makersempire.com/design-thinking-for-schools-poster/
- Introduction to SDGs for Young People https://www.un.org/sustainabledevelopment/youth
- Explore the SDGs https://sdgs.un.org/

 SDG Focus: See Introduction to Sustainable Development Goals lessons

- Introduction to SDGs for Young People https://www.un.org/sustainabledevelopment/youth/
- Explore the SDGs https://sdgs.un.org/

Local Trip / Expertise / Additional Work and Assessments

Worksheet: Stakeholder Mapping supports learners to focus on their local place, its issues and its audience.

Linked learning: Communication Skills and Media Communication Skills micro-modules support the development of the 4Cs skills – Creativity, Communication, Critical Thinking and Collaboration. Tutors are encouraged to work with other tutors to develop the project through multiple outcomes such as video, poster, Pecha Kucha, Interviews or Podcasts see The Future of the Ocean, Micro Module MM7: Media Communication 1 - 4

SDG4 P2P L1: DESIGN THINKING INTRODUCTION

WHAT IS DESIGN THINKING?

Working in pairs, Google these words (or use a dictionary) to find out what they mean and re-write the definitions in your own words.
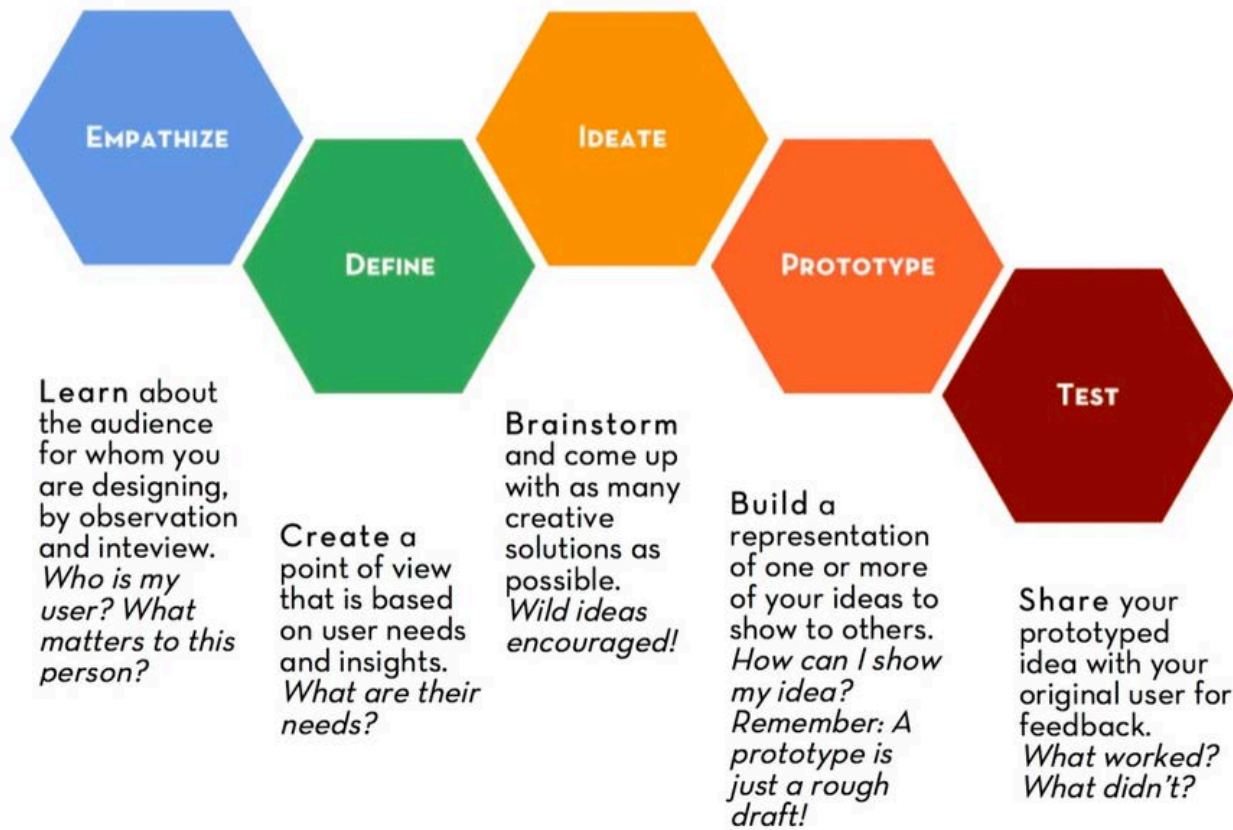
1. Ergonmic -

2. Context -

3. Culture -

4. Stakeholders -

Your answers will be shared with the class to build a vocabulary list and definitions - this is called a glossary

The 5 stages of Design Thinking:

EMPATHIZE

Learn about the audience for whom you are designing, by observation and inteview. *Who is my user? What matters to this person?*

DEFINE

Create a point of view that is based on user needs and insights. *What are their needs?*

IDEATE

Brainstorm and come up with as many creative solutions as possible. *Wild ideas encouraged!*

PROTOTYPE

Build a representation of one or more of your ideas to show to others. *How can I show my idea? Remember: A prototype is just a rough draft!*

TEST

Share your prototyped idea with your original user for feedback. *What worked? What didn't?*

Before you start to work on your problem or project have a look at each stage and see what you need to think about in any project. You will also have to manage your time as the last three tasks will take more time.

Empathise - Most projects will involve people at some point. What might you need to think about - Discuss with your partner and write down 3 things that might matter to a user / audience member

1.

2.

3.

Define - What's your problem? Often we deal with symptoms - a runny nose, a sore throat but we need to deal with our immune system. In defining your problem you will look at the whole system. Write down 3 problems you know of in your community or the world.

1.
2.
3.

SDG4 P2P L1: DESIGN THINKING INTRODUCTION

QUALITY EDUCATION 4

The 5 stages of Design Thinking:

Ideate - This is the stage in the process to think about as many ideas as possible. For now, write down the 2 worst ideas you can think of - swap them with your partner and try to create three good ideas from each others bad ideas.
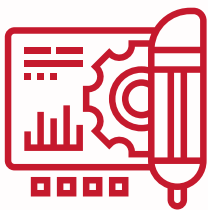
Bad Ideas.   Good Ideas

1   1.

2.   2.

Prototype- using only 1 piece of paper build or make one of the good ideas above. You will have to be creative, how will you make the shapes; folding, tearing? If you are to fix it together, how might you do this - links, cutting, what other ways of joining things together can you experriment with?

Remember: There is no right answer this is about experimentation - have fun.

Test - The final stage is testing. In this stage you learn about the product, service or idea you have created . Share your 'good idea' prototype with your partner and they will share with you.

Test - The final stage is testing. In this stage you learn about the product, service or idea you have created . Share your 'good idea' prototype with your partner and they will share with you.

Things to discuss / consider and questions to ask:

1. Who might the user be?
2. Look at how it is made - remember there were limits to materials so you are looking at their problem solving and creativity.
3. Is there anything they could try to make it better or improve it using the materials they had?
4. How might you explore the idea further if time and materials were not a limit?
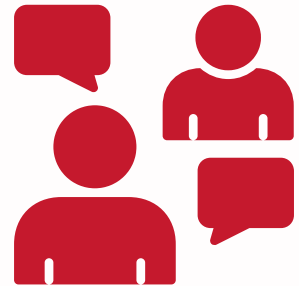
Stakeholder Mapping

A project's stakeholders are the people or groups of people who can impact or are impacted by a project. If doing a project you will need to understand the different parties involved and how you will need to communicate and engage with them

You will now begin to undertake a stakeholder mapping of your local place. Usually you will start this by having your decision challenge at the centre of your mapping..

 Individually or as a class create a list of all the different individuals, groups, or organisations that you can begin to identify and categorise who you might need to discuss or share your project with.

SERVICES / PROVIDERS

USERS / BENEFICIARIES

YOUR Place

GOVERNANCE

INFLUENCERS

4 QUALITY EDUCATION

DIFFERENT WAYS OF MAPPING

Now you have a list you are going to practice organising them with project samples

Low **Strength of interest** High

Low

Inform	**Consult**
LOW INTEREST LOW INFLUENCE **SHARE / MONITOR RESPONSE**	**LOW INFLUENCE HIGH INTEREST** **INVOLVE**
LOW INTEREST HIGH POWER **KEEP THEM INFORMED**	**HIGH INFLUENCE HIGH INTEREST** **INVOLVE AND WORK WITH THEM**
Involve	**Partner**

Influence on success

High
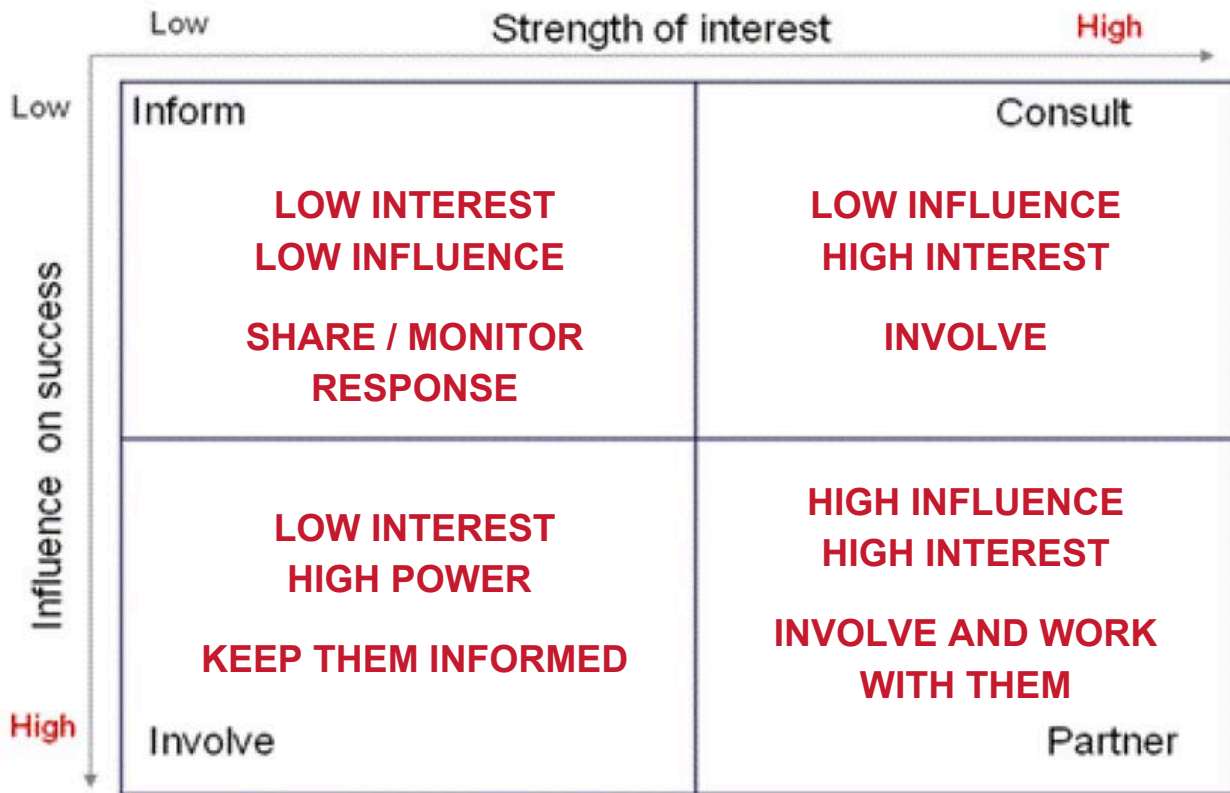
1. You are developing a skate park in a square in the centre of town - use your own town / village and pick the most central spot.

   Use the grid above to organise your list of stakeholders and how you will need to communicate and engage with them.

2. You are want to create a youth music festival for your town / village.

   Use the grid above to organise your list of stakeholders and how you will need to communicate and engage with them.

You will undertake another stakeholder mapping once you have your own project idea.

Learning about Complexity

Why are systems complex? https://www.youtube.com/watch?v=3ZpNZbLQ8Ik

What is a Wicked Problem (Rittel, 1973)?

What is a wicked problem? https://www.youtube.com/watch?v=lOKpB4KtUZ8

Watch the video and give four qualities of a wicked problem.

1.
2.
3.
4.

Climate Change is a Wicked Problem

https://www.youtube.com/watch?v=XRoCxS6n53U

How can Design Thinking help with wicked Problems?

https://www.youtube.com/watch?v=WrdSkqRypsg

Watch both the videos and list three areas you might use Design Thinking to work on an issue of climate change.

Problem to Pitch - Project Management

Lesson 2: Design Thinking 1 Empathy

Subjects: Science, Design, Technology, Maths Environment, Sustainability

Lesson Title and Summary: Design Thinking Stage 1 Empathy

Stanford Design School's five chairs exercise encourages learners to develop design principles for a user profile. Learners will consider the five users needs (this sets the design principles) and develop ideas on paper and create 3D prototypes of their designs. This activity encourages iteration on their designs and practice using different materials.

Learners will consider the 5 users' needs (this sets the design principles) and develop ideas on paper. In this lesson they will also complete a user empathy map and create 3D prototypes of their designs. This activity encourages students to iterate on their designs and practice using different materials.

Vocabulary: Assumptions; (Biases, Judgement) Design Principles; Empathy; Identify; Immersion

In this lesson, the learner will:

- understand empathy in design
- develop critical thinking through the practical tasks of asking students to analyse their user's profile to find their needs.
- build, test and iterate design ideas grounded in a user's needs.
- practice group work and develop the ability to work through design challenges collaboratively

Materials:

- Worksheet: User profiles
- Worksheet: Empathy Map
- Pens, pencils
- Paper
- Scissors
- Corrugated Cardboard
- Pipe Cleaners
- Modelling Clay
- Tape
- Match sticks or toothpicks

Activity Instructions

Activity 1 Developing design principles from user profiles (15 mins)

1. Organise learners into groups of 2 or 4.
2. Introduce the lesson and the importance of empathy in design.
3. Hand out the user profile worksheet, one per group.
4. Explain the task and ask different groups to read out each of the user profiles from the user profile worksheet.

Activity 2 Developing paper designs (15 mins)

1. Ask learners to select a user they wish to work on and identify two needs (design principles) they see in the description of their user.
2. Learners will develop design ideas on paper for two of the users that integrates the users needs (design principles).
3. Empathy Questions Checklist - use the empathy map to expand on the users
• Did you identify the design principles required for your user?
• Did you make any assumptions about your user?
• Did you discover any biases / judgments about your user that you might have?

Activity 3 Develop a 3D prototype (25 mins)

1. Ask learners to select one of their 2 paper designs and build a 3D prototype using the materials provided, building two design principles (needs) into their prototype.
2. Ask learners to add one more design principle - this is to try to reflect their own style as a designer.
3. Include further discussion – see Media Box.

REFLECTIVE EXERCISE: 3-2-1
- Three things they feel they have learnt from the tasks
- Two things they found most interesting and would like to explore more One – their opinion they have about the tasks

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

EXTENSION / REDUCTION ACTIVITIES

Reduction: For a shorter class select a user and story card randomly - make paper designs only for that user. Follow up with 3D designs in a following lesson.

Extension: For a longer class do both activities with more additional user profiles.

If students have project themes in mind, they could also begin to develop their user profiles based on their stakeholder mapping and local organisations using the empathy map – see Media box.

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

Video: The importance of Empathy [3:30 mins] https://www.youtube.com/watch?v=UzPMMSKfKZQ

Video: What is an Empathy Map? [5:36 mins] https://www.youtube.com/watch?v=QwF9a56WFWA

Video: Empathy not Sympathy [2:32 mins] https://www.youtube.com/watch?v=HznVuCVQd10

Linked learning: Media Communications modules support the development for the 4Cs skills - Creativity, Communication, Critical Thinking and Collaboration

Activity 3 Design Discussion Questions:

- What was it like to build your chairs using the design principles you identified?
- What was it like to create different iterations of your design?
- What did you change along the way? What did you learn from your prototypes?
- Did anyone get stuck at any point? What was that like? What did you do to get unstuck?
- Which material did you enjoy working with the most? Why?
- Which material did you like the least? Why?
- Which material best expresses the essence of the chair you drew?

Local Trip / Expertise / Additional Work and Assessments

Connect to one of the organisations in the local town or village and develop a new service based on their general user profiles.

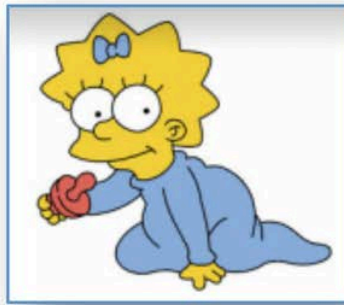Develop an empathy map for a user of a local service.

QUALITY EDUCATION 4

The 5 chairs Design Thinking exercise

d. 5 Chairs users profiles – Stanford d.School

Grandad is an old man who is achy and sometimes a bit grouchy. He has trouble getting around, so he walks with a cane. He also has difficulty getting into and out of his chair, though he sits in his chair most of the day.

Maggie is a 1 year old who loves to play and crawl around everywhere. Maggie likes to explore on her own and be independent while she sucks on her dummy. When it's time for her to sit still she gets whiny and squirmy.

Ralph is at secondary school and spends 8 hours a day in class. Most of the time, Ralph has to sit in uncomfortable chairs, sitting up and facing the front of the room. When Ralph moves between classes, he carries a large backpack. When he gets to class he needs a place to put his stuff.

What do you notice about their needs?

Underline the important points of each of the user - the clues are in the descriptions.

The 5 chairs Design Thinking exercise

Continue the exercise with the final two users.

Underline the important points of each of the user - the clues are in the descriptions.

Neil is an astronaut who travels to space. When he is in his space ship, he is in a weightless environment. This is cool most of the time, but it is a challenge when he needs to sit down and drink his Sprite. Neil also has a bulky space suit that often gets in the way.

Lisa is a marathon runner who runs every single day. She hates being stationary, and because she exercises so much she has really sore muscles. When she finally does sit down it's really important that her chair be very comfortable to help her relax and recover for her run the next day.

Empathy in Design

Empathy is the ability to put your self in someone else's shoes. It is important to use empathy within design otherwise our designs will not be useful. In a world with limited resources sustainable design must make sure that designs are not wasting valuable resources because they don't work and there was no engagement with the user.

SDG4 P2P: L2WS EMPATHY MAP

What does your user think and feel?

- What really matters to them?
- What do they think about?
- What are their worries, dreams or aspirations?

What does your user see?

- When do they use the town and what do the see - do they walk, cycle or drive through the town?
- What might they notice?

SEE

THINK AND FEEL

HEAR
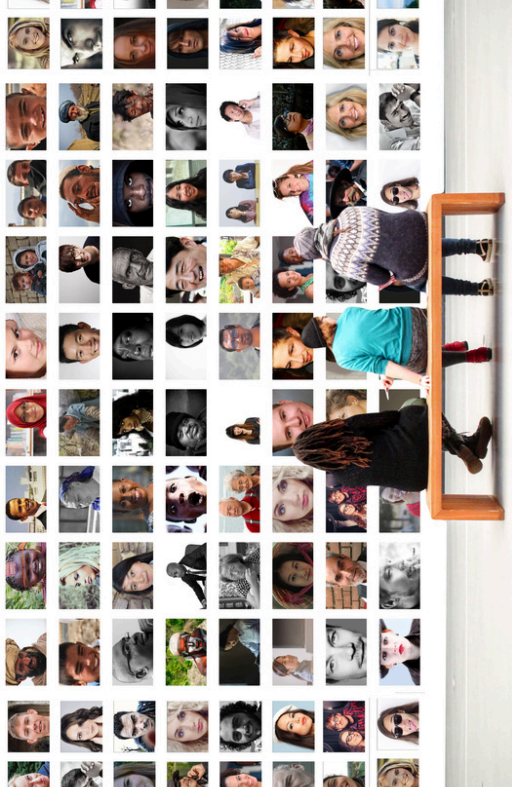
WHAT DO THEY SAY AND DO

What sort of things does your user hear / listen to?

- Where does your user get their information?
- Who might your user listen to or be influenced by?

- What other things might your user do?
- What other things are they interested in?

Problem to Pitch - Project Management

Lesson 3: Design Thinking Define

Subjects: Science, Design, Technology, Maths Environment, Sustainability

Lesson Title and Summary: Design Thinking Stage 2 Define

In this lesson learners will begin to understand how to define a problem. Learners are asked to begin to identify a real problem they have wanted to address on a local or global level, using the SDGs as a starting theme. Learners also have an opportunity to develop an awareness of a local problem

Vocabulary: Assumptions, Analyse, Conflicts, Define, Source

In this lesson, the learner will:

- understand the importance of getting to the source of a problem
- become more accustomed to the SDGs
- develop and awareness of how to localise the SDGs
- develop an understanding of the connection of local and global issues
- complete a problem tree
- understand the complexity of wicked problems in their location
- develop critical thinking about problem solving

Materials:

- Worksheet: Define Your Problem
- Worksheet: Problem Tree
- Worksheet: Zoning Map
- Teachers' Guide: Using a Problem Tree
- Paper
- Local Newspaper
- Pens, Pencils

Activity Instructions

Activity 1 Finding and defining your local problem, issue or concern (20 mins)

1. Organise learners into groups of 2-3.
2. Give each group of learners a local news paper and ask them to search for local problems, issues and concerns. Alternatively, if using the internet, ask learners to search online versions of local newspapers for local problems, issues and concerns.
3. Ask each group to feedback at least one problem, issue or concern.
4. As a class begin to think about your local area list of problems, issues and concerns.

Activity 2 Aligning your problem area to the Sustainable Development Goals (10 mins)

1. Visit the Sustainable Development Goals (SDGs) Knowledge Platform- see Media Box.
2. Ask learners to use the SDGs Knowledge Platform to select the SDG which is most closely aligned to their problem area e.g. Health – SDG 3, Gender – SDG 5, Climate – SDG 13.
3. In their groups, ask them to look at the targets and indicators of their selected SDG and begin to think about the potential impact their solution might need to address.

Activity 3 Use a Problem Tree (20 mins)

1. As a class, watch the Defining the Problem video - see Media Box.
2. Use Worksheet: Problem Tree to write the main challenge on the problem tree trunk.
3. As a group, discuss the causes of this problem and write them underneath the problem. These become the "roots" of the tree.
4. Discuss the effects or consequences of this problem and write them above the problem. These become the "branches" of the tree.
5. For each cause, ask what causes it. For each effect, ask what the consequences are. Continue this process until no further causes and effects are mentioned. You may not have all the answers at this point, so make notes of any assumptions, questions, conflicts, or gaps in knowledge.

REFLECTIVE EXERCISE: 3-2-1

- Three things they feel they have learnt from the tasks
- Two things they found most interesting and would like to explore more One – their opinion they have about the tasks

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

EXTENSION / REDUCTION ACTIVITIES

Reduction: For a shorter class, complete Activities 1 and 2 only.

Extension: For a longer class, watch Video: How to Write a Great Problem Statement (see Media Box) and begin to try to develop a problem statement. In addition, ask students to read the P2P define supporting sheet and discussion

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

Video: Defining the Problem [1:25 mins] https://www.youtube.com/watch?v=2rJRVv-NOaA\

Video: How to Write a Great Problem Statement [1:36 mins]
https://www.youtube.com/watch?v=ezxp_yt4kDA

Website: UN SDGs Knowledge Platform https://sdgs.un.org/goals

Linked Learning
- SDG 4 Supporting Skills -SDG Web Quest lesson plan, Interview skills
- To focus on SDG 14, combine SDG 4 Problem to Pitch with SDG 14 Problem to Pitch Marine Plastic Waste micro-module lesson plans and worksheets
- Communication Skills and Media Communication Skills micro-modules support the development of the 4Cs skills - Creativity, Communication, Critical Thinking and Collaboration

Local Trip / Expertise / Additional Work and Assessments

- Contact the local librarian to collect back issues of the local news paper for students look at for local problems.
- Students to visit local town and map the organisations and institutions in their local place – they can use the pCr Zoning map or the stakeholder mapping, or both.
- Learners can begin to develop an empathy map for a user of a local service that seeks to 'solve' their problem area.
- Learners can interview local organisations to find out more about their problem issue through primary source research.

SDG4 P2P: L3TG USING A PROBLEM TREE

What is the purpose of a problem tree?

The 3 most important points of a problem tree are:

- It allows us to break down the problem, the causes and its effects, improving its analysis.
- There is a better understanding of the problem by breaking it into causes and consequences.
- Facilitates the realisation of other important components of a project in its planning stage, e.g. stakeholder analysis, risk analysis and objectives.

When introducing the exercise and worksheet: Using a Problem Tree, it might be helpful to discuss an example on the board so that students are clear on what is meant by problem, impact, cause, and effect.

Remind them that there can, and usually will be, more than one impact, cause, solution, and effect. Show them how the effect of a solution might bring up a new problem to solve and take through this process.

Step-by-Step:

- Analyse the situation: What is happening, why is it happening and what is triggering it. Collect data that will allow you to understand the problem situation, this will help
- Identify the main problems of the situation you have analysed: Use brainstorming, defining by consensus what the main problem is.
- Determine the effects and causes of the main problem: You already have the trunk of the tree, now identify the causes (roots) and the effects or consequences (leaves or branches). Again, it is better if this is done as a team, seeking to reach a consensus. If in step 2 you elaborated the Vester matrix, you will already have this step quite clear.
- Draw the tree: Simple. We will see how in the example below.

Example:

Problem = People need to access a local walking trail in the evening after work and it gets dark early in the winter.

Impact = No one uses the trail in the evenings in the winter the space is wasted.

Cause = (1) It gets dark early as there's no natural light. (2) People don't feel safe using the trail in the dark. They can't see where they are going and might trip and fall. It's dull and boring in the dark.
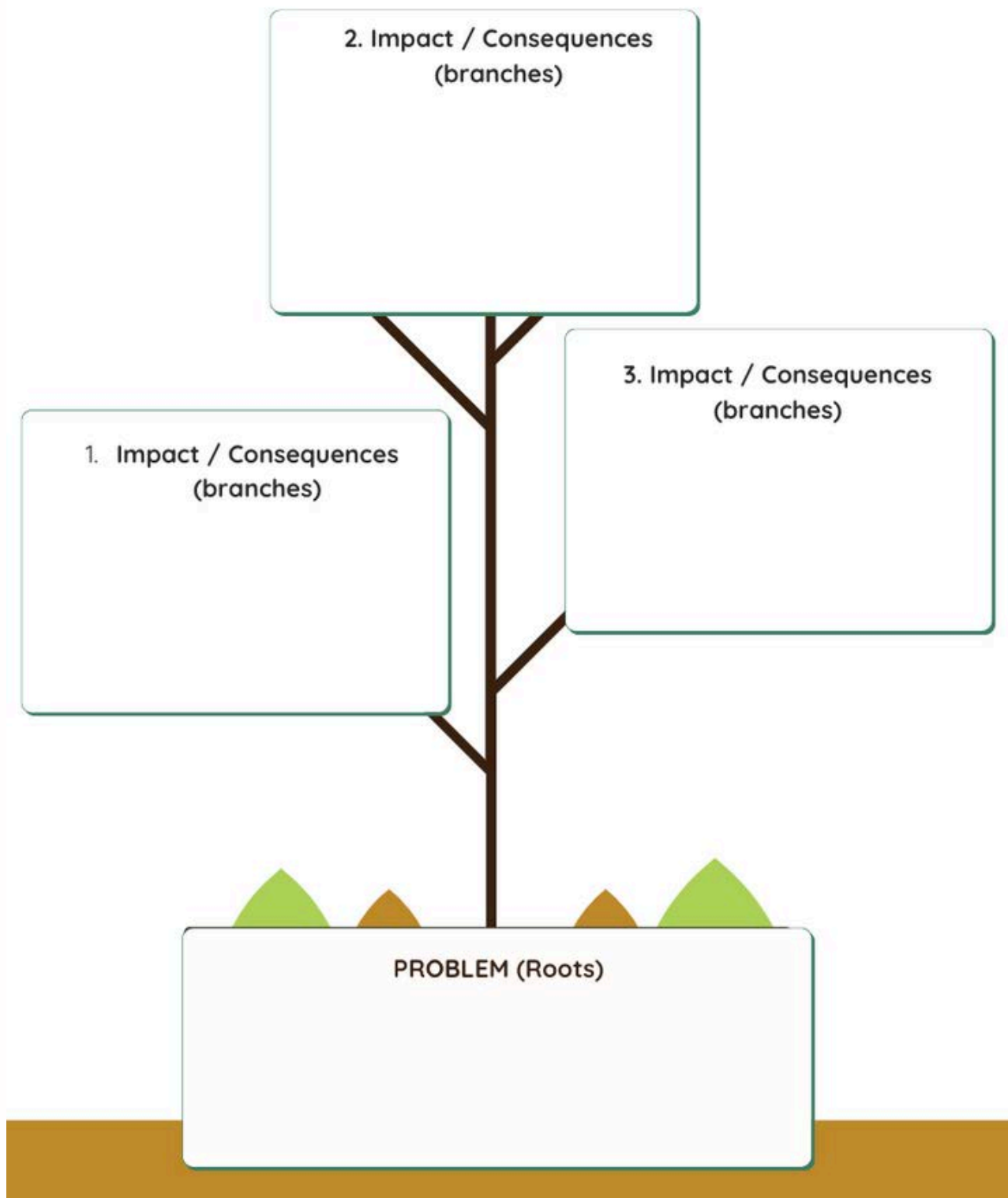
Solution 1 = We install lights.

Effect of solution 1 = We can't just install any lights, we have to align to policy SDG 7 / cSDG13 carbon emissions.

Video: How to Use a Problem Tree Analysis [7:57mins]
https://youtu.be/q6qYZiW5BWU?si=zoP2-ctV_zzyWsYp

2. Impact / Consequences (branches)

3. Impact / Consequences (branches)

1. Impact / Consequences (branches)

PROBLEM (Roots)

Problem Solving

Step 1 - Understand the Problem:

While it may seem obvious, identifying the problem is not always as simple as it sounds. The biggest issue can be identifying the wrong source of a problem. This could mean your attempts to solve it are inefficient or even useless. Remember: Once the correct source of the problem has been identified you need to fully define it before it can be solved effectively.

Things to think about:

- What do I know already about the problem? – Make a list.
- Can a picture or diagram help you? Try to visually draw or map the problem.
- Who's telling me about this problem? What is their perspective?
- What do I need to find out?
- Do I need to speak with anyone else about this problem?
- Try rewriting the problem in your own words?
- What do you think the problem is?

Step 2: BRAINSTORM

In this phase, you will need to think, talk, sketch, doodle, contemplate, or journal, in order to start allowing ideas to formulate. Then, set aside some daydreaming time and get started. Think big and let all the ideas you have hit the page without editing them.

### Step 3: Research: How are you going to turn the idea into a reality?

Brainstorming, researching and refining your problem go hand in hand. You will be going back and forth between the three until you come up with a plan.Once you brainstorm some great ideas for your business, you will need to research to learn more about the problem, product or service. In turn, that leads to more brainstorming and refining your problem.

In the next phase you will think of how to turn your idea into a reality. Start to make a make a list of any questions or concerns that come to mind. Its never too early!

- What materials do you need?
- What will it cost?
- Can you build it yourself or will you need help?
- If you will need to collaborate on this piece, decide who that will be and make plans to work together?

SDG4 P2P: L3WS PROBLEM SOLVING TREE

SOLUTION 3

SOLUTION 2
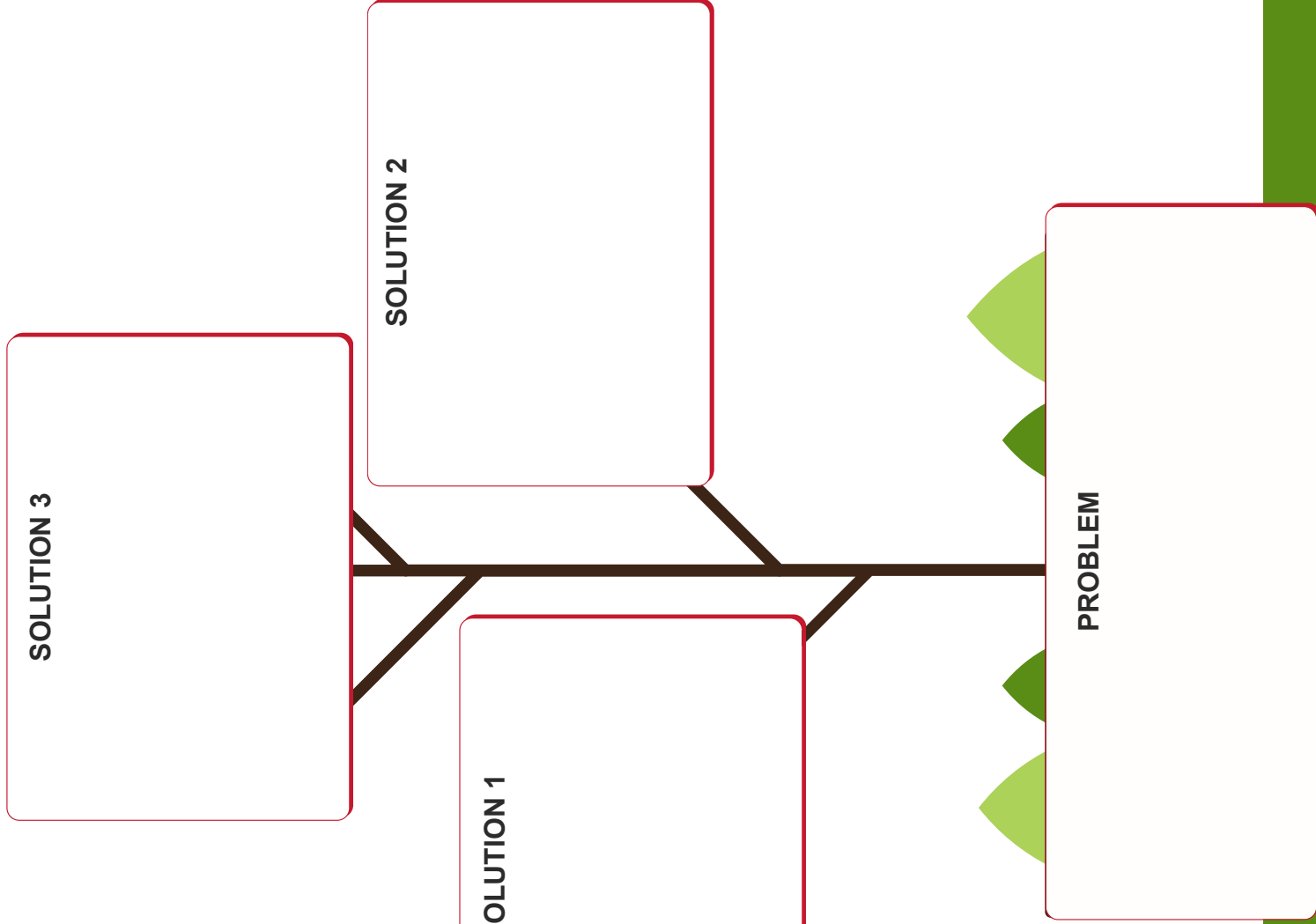
SOLUTION 1

PROBLEM

Find out different ways to solve a problem.
Pick the best one.

I choose solution number _____

because _____
_____

SDG4 P2P L3WS ZONE MAPPING

A zone map allows us to start from ourselves Zone 0 (our project or our town) and include other people, places or things in relationship to ourselves Zone 1 - 5.

Zone 0 – the self, the project

Zone 1 - Location of project, e.g. school or town

Zone 2 - Location of school or town

Zone 3 - Location of town, e.g. Iveragh, Kerry

Zone 4 - Location of county, e.g. Munster or Ireland

Zone 5 - Location of province or country, e.g. Ireland or Europe

4 QUALITY EDUCATION

Zone 0

Zone 1

Zone 2

Zone 3

Zone 4

Zone 5

Problem to Pitch

Lesson 4: Design Thinking Stage 3 Ideate

Subjects: Climate Action and Sustainable Development, Design, Environment, Science Technology, Sustainability

Lesson Title and Summary: Design Thinking Stage 3 Ideate

This lesson enables learners to develop an understanding of the process of generating ideas starting with their personal experience and then moving into project themes.

Vocabulary: Agility, Creativity, Disruptive Innovation, Enterprise, Problem Finding and Solving

In this lesson, the learner will:

- explore their own experience as a source of ideas
- feel comfortable with exploring experimental approaches
- develop skills around idea generation
- accommodate variables and limits into design processes
- learn to transfer and apply skills

Materials:

- Worksheet: Ideate Remix
- Worksheet: Remix SWOT
- Worksheet: Step Into the Problem
- Paper
- Pens, Pencils

Activity Instructions

Activity 1 Remixing ideas -Rapid Response (25 mins)

1. Explain the activity – learners will use aspects from their own experience to practice the concept and begin to understand how to develop creative problem solving skills.
2. Ask learners to form groups of three.
3. Working in groups, each person fills in a row on Worksheet: Ideate Remix
- naming a hobby,
- what they like about it,
- the obstacles - what annoys them or stops them from doing it
- and how they would change that.
- They can make this up – encourage them to be creative, be funny but make sure that the row entries are related - put on ten-minute timer.

4. Teacher Prompt - Ask the group for input from the grid randomly e.g. "Group 1 tell me what's written in the second column, row 2, write their answer on the board. Repeat three more times until you have something on the board from each of the columns e.g. Group 4 tell me what's written in the column 3, row 1, Group 2 tell me what's in column 4, row 2, Group tell me what's in the column 2 row 3 – see example below.

Hobby	What they like about the hobby	Obstacles to undertaking the hobby	What change would remove obstacles?
Football	Meeting others	Not enough opportunities to meet others	Transport

5. Ask the groups to start coming up with possibilities for a business, activity or service that include the 4 variables, the more random the variables, the better to push their creativity.

Activity 2 Remixing ideas- Rapid Response 2 (25 mins)

1. Repeat the activity replacing the category headings with local themes / issues.

REFLECTIVE EXERCISE: 3-2-1
- Three things they feel they have learnt from the tasks
- Two things they found most interesting and would like to explore more One – their opinion they have about the tasks

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

EXTENSION / REDUCTION ACTIVITIES

Reduction: For a shorter class, complete Activity 1, lengthening the time. Complete Activity 2 in a following lesson.

Extension: For a longer class, use the work in Activity 2 with Worksheet: Remix SWOT. Ask the class to go through the same process for the Idea Remix using one of the businesses, services or Activity 1 ideas that has come out of the first part of the lesson.

Learners can begin to develop an empathy map for a user of the ideas, products or service that have come out of Activity 1.

They can also use the worksheet: 'Step Into the Problem' to help them think about the potential users and how they might need to adapt their ideas

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

Video: Design Thinking Ideate [4:03 mins] https://www.youtube.com/watch?v=zbLxs6te5to

Website: UN SDGs Knowledge Platform https://sdgs.un.org/goals

Linked Learning:
- SDG 4 Supporting Skills -SDG Web Quest lesson plan, Interview skills
- To focus on SDG 14, combine SDG 4 Problem to Pitch with SDG 14 Problem to Pitch Marine Plastic Waste micro-module lesson plans and worksheets
- Communication Skills and Media Communication Skills micro-modules support the development of the 4Cs skills - Creativity, Communication, Critical Thinking and Collaboration

Local Trip / Expertise / Additional Work and Assessments

- Visit local town and map the organisations and institutions in their local place – they can use the pCr Zoning map or the stakeholder mapping, or both.
- Learners can begin to develop an empathy map for a user of a local service that seeks to 'solve' their problem area. This can also be extended by using the worksheet: 'Step Into the Problem' to help them think about the potential users and how they might need to adapt their ideas
- Learners can interview local organisations to find out more about their problem issue through primary source research.

SDG4 P2P: L4WS Idea Remix 1

4 QUALITY EDUCATION

This worksheet will help you play with ideas using your own experience and pastimes.

Fill in the boxes - we will then work with the whole group to develop a number of possible ideas.

Do you have a Hobby or Pastime?	What is it you like about your hobby?	Obstacles to doing your hobby?	What would make it easier to do your hobby?

Hobby	Likes	Obstacles	Change

Hobby	Likes	Obstacles	Change

SDG14 P2P: L4WS Remix 2 SWOT Analysis

What will you do with your building? This worksheet will help you play with ideas using a SWOT analysis. Fill in the boxes for three different ideas for your teams' building.

Purpose	Strengths	Weaknesses	Users

Purpose	Strengths	Weaknesses	Users

Purpose	Strengths	Weaknesses	Users

SDG4 P2P: L4WS Step into the problem

This worksheet helps you think about your users and any issues they might have

4 QUALITY EDUCATION

● What's the Problem – A

● Empathy A, Step into the problem

● Possible ideas / Solutions:

● What's the Problem – B

● Empathy B, Step into the problem

● Possible ideas / Solutions:

● What's the Problem – C

● Empathy C, Step into the problem

● Possible ideas / Solutions:

Name: _____

Date: _____

Assessment : _____

SDG4 Problem to Pitch

Lesson 5: Design Thinking Stage 3 Ideate 2.0 Good Idea / Bad Idea

Subjects: Climate Action and Sustainable Development, Design, Environment, Science, Technology,

Lesson Title and Summary: Design Thinking Stage 3 Ideate 2.0 Good Idea / Bad Idea

This lesson builds on Lesson 4 and 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.

Vocabulary: Beta-test, Focus Group, Lean Canvas, Refine

In this lesson, the learner will:

- explore how to evolve ideas
- consider opportunities to improve ideas
- feel comfortable with exploring experimental approaches
- develop skills around idea generation
- learn to transfer and apply skills

Materials:

- Teacher's Guide Worst Idea ever
- Paper Pens,
- Pencils

Activity Instructions

Activity 1: Worst Idea Ever – Rapid Response (15 mins)

1. Learners will work in groups of 2-3 to come up with examples (aim for 5-7) of the worst ideas ever. See Teacher's Notes for examples to model.
2. Give groups five minutes to come up with their examples.
3. Share ideas as a whole group.

Activity 2 Transforming Ideas – Rapid Response (15 mins)

1. Select one of the examples that was given and show how it could be transformed into a good idea. Ask for some other examples to be modelled by learners.
2. Swap example lists around so that each group has another group's list.
3. Ask learners to transform as many of the examples into good ideas as possible in 10 minutes.

Activity 3 Generating and Remixing Ideas – Rapid Response (20 mins)

1. Ask each group to share 1-2 of the ideas that they transformed. Write on the board.
   - Discuss some of the ideas that have been generated.
   - What was more difficult- thinking of bad ideas or transforming them into good ones?
   - Were they surprised at how hard / easy the task was? Which activity did they find easier?
   - Which of the ideas listed on the board are actually good ideas? What makes them good?
   - How does this type of activity help businesses to develop products, services and ideas?
   - Can they see how they might use this method with other skills?

2. Use the activity to introduce key ideas of open source; ideas development and iteration.
3. Watch the Video: Open Source As Explained by Lego video (4:04 min see media box) or the Video: Open Source Culture, ask the learners to think about this and consider whether their projects could be Open Source projects - Learners can report back using Teams.

REFLECTIVE EXERCISE: 3-2-1

- Three things they feel they have learnt from the tasks
- Two things they found most interesting and would like to explore more One – their opinion they have about the tasks

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

EXTENSION / REDUCTION ACTIVITIES

Reduction: For a shorter lesson, complete Activity 1 & 2 and move Activity 3 to the following lesson, or set as a digital at-home writing task.

Extension: For a longer lesson, increase timing on Activity 2 & 3. Introduce key ideas of open source by watching Video: What is open source as explained in LEGO (see Media Box). Discuss the benefits of open source for idea generation and development.

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

Video: What is open source as explained in LEGO [4:40 mins]

https://youtu.be/a8fHgx9mE5U?si=21jFIhOZDkwMt8QC

Video: Open source ventilator [5:15 mins] https://youtu.be/ZbzqM3BA8W8?si=X2Z2Eydgyj-coghe

Video: Introduction to CRISPR Gene Editing Technology [4:22 mins]

https://www.youtube.com/watch?v=1VaG3DpFXjs

Video: Open Source Quaponic Greenhouse [3:44 mins] https://vimeo.com/141252002

Website: The Rapid Foundation https://www.therapidfoundation.com/

Website: Colin Keogh and the Open Source Ventialor Project (Ireland)

https://sciencegallery.org/stories/colin-keogh-and-the-open-source-ventilator-project

Local Trip / Expertise / Additional Work and Assessments

Share some examples of open source projects for learners to research – see media box

- Open Source Ventilator
- Crispr Editing
- Aquaponic Greenhouse

Invite an innovator to talk about ideas generation e.g. Dr Colin Keogh from The Rapid Foundation

SDG4 P2P L5TG WORST IDEA EVER SUPPORT SHEET

4 QUALITY EDUCATION

The session is an iteration of the 'Worst Possible Idea' a term coined by author, president and co-founder, Bryan Mattimore, The Growth Engine Company LLC.

As a facilitation tool for ideation, the 'Worst Possible Idea' (WPI) turns the process of developing ideas upside down. Rather than having the pressure of coming up with new or innovative ideas, the activity facilitates agile creative thinking in a relaxed, fun, collaborative atmosphere. The process is used by professionals, design studios, within hackathons and start-up weekends, and has been shown to boost confidence, challenge assumptions and offers a more inclusive approach to ideation.

To start, here are some 'bad' ideas you can model:

- a sealed metal tube for a boat / as transport
- a chocolate teapot
- windows you can't see out of

How could these be transformed into good ideas?

- a sealed metal tube for a boat / as transport = add an engine / design and pressurise it
- (submarine), add windows and wings (aeroplane), different wheels and slick design (bullet train)
- a chocolate teapot why is it a bad idea? It would melt. However, the 'hot chocolate spoon' that retails for about €4-5 uses that quality as a design feature to create a gift / treat product
- windows you can't see out of = this how 'bathroom' or privacy glass started
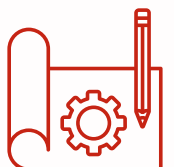
Problem to Pitch -

Lesson 6: Design Thinking Stage 4 Prototype

Subjects: Science, Design, Technology, Maths Environment, Sustainability

Lesson Title and Summary: Design Thinking Stage 4 Prototype

In this lesson, learners will begin to consider their ideas for prototyping, develop a concept statement and look at ways to prototype their ideas depending on their users / audience.

Vocabulary: Concept Statement, Enterprise, Innovation

In this lesson, the learner will:

- explore how to evolve ideas
- iterate their ideas
- develop a concept statement
- explore prototyping methods
- develop prototyping skills

Materials:

- Worksheet: Rapid Response Prototyping
- Worksheet: Ready Set Design
- Worksheet: Concept Statement
- Worksheet: Vision Board
- Paper
- Pens, Pencils
- Modelling material e.g. plasticine, clay Ready Set Design (RSD) materials' bags for each class team

  - A fastener e.g. pipe cleaner, pin, paper clip
  - A surface e.g. material, tin foil, card
  - A strucure e.g. sticks, straws,box,

Activity Instructions

Activity 1 Prototyping – Rapid Response (10 mins)

1. Watch Video: What is a prototype? (see Media Box).
2. Discuss the benefits of prototyping.

Activity 2 Developing your Prototype – Rapid Response (40 mins)

Option A: Students can focus on their selected problem area and continue to work on those activities; as a team they should complete a concept statement, vision board and make 3D model of their idea based on their users and empathy map (Lesson 2).

Option B: If students have not selected a problem area, set a design challenge – Ready Set Design is a quick 3D design challenge, that uses 3D prototyping (refer to Multimedia Box.

Option A
Students work through the rapid response prototyping worksheet to focus on their problem area.

Option B
Students undertake a Ready Set Design design challenge using the Ready Set Design worksheet, selecting an open ended problem aligned to the SDGs and a global challenge and using a bag with three items they have to use

REFLECTIVE EXERCISE: 3-2-1

- Three things they feel they have learnt from the tasks
- Two things they found most interesting and would like to explore more One – their opinion they have about the tasks

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

EXTENSION / REDUCTION ACTIVITIES

Reduction: For a shorter class, have the learners watch the What Is A Prototype? video at home and come into class with three benefits of prototyping.

Extension: For a longer class, have students present a concept statement and their prototype or design ideas. Using their empathy maps and the project's driving questions learners will create a concept statement focus on their project or SDG and its selected problem area e.g. climate adaptation.

Additionally Learners could use their concept maps and empathy statements to develop a vision board using the worksheet: Vision Boards. This could be used as part of the linked learning activities.

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

Video: What is a prototype? | Nesta [1:16 mins]
https://youtu.be/_1bOaNSy5XY?si=vXnlIoEbl-Lq6LIwR

Video: Rapid Prototyping: Sketching | Google for Startups [7:31 mins]
https://www.youtube.com/watch?v=JMjozqJS44M

Video: Design Thinking: Prototype [4:53 mins] https://youtu.be/Q4MzT2MEDHA

Local Trip / Expertise / Additional Work and Assessments

Learners could present their project ideas using a Vision Board - see worksheet: Vision Board

Visit a local industry to explore their research and development processes and design department

Some Innovation Centres

- Kerryscitech https://kerryscitech.com/
- The Tom Crean Business Centre https://www.creancentre.com/
- RDI Hub Killorglin (home to the NDRC in the South West https://rdihub.com/
- HQ Kerry https://hqkerry.com/locations/hq-tralee/
- Cork Bic https://www.corkbic.com/

MM1: L6WS 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.

SDG4 P2P: L6WS RAPID RESPONSE PROTOTYPING
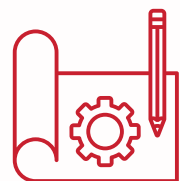
READY, STEADY, BUILD: KNOWLEDGE GATHERING

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:
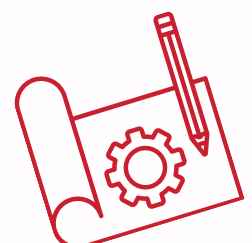
- Structure
- Fastening / Joining
- Surface

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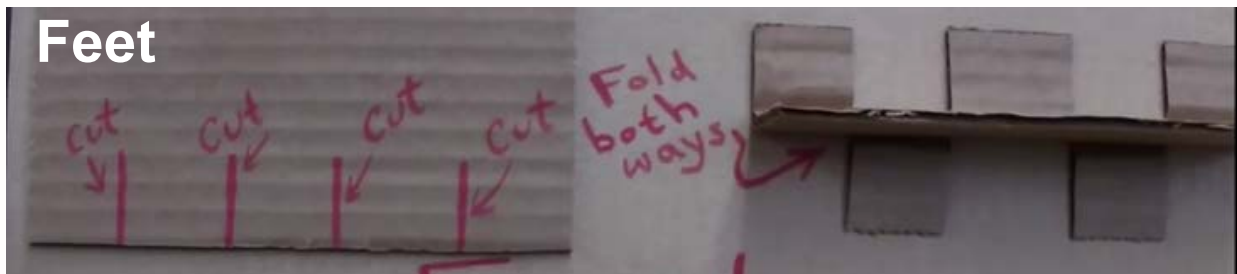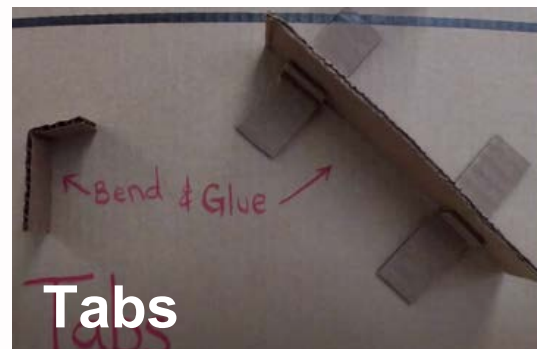
Watch the short video on structural techniques - all these processes can be scaled up to make bigger models and forms.

Write down the key ideas in the video. Use bullet points.
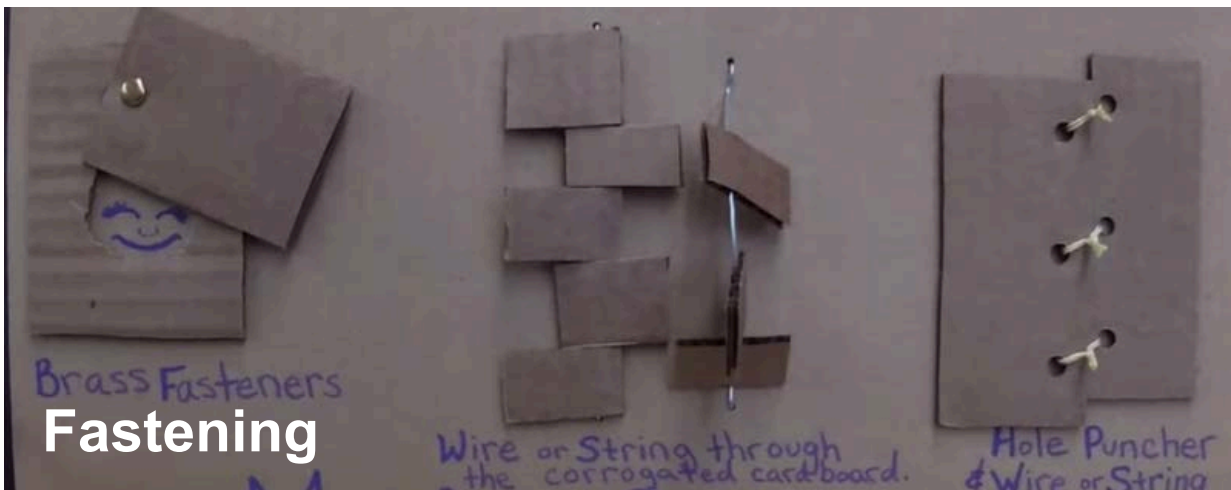
Creating 3D sculptures https://www.youtube.com/watch?v=pi6Y7yCz7Y8

2. <u>Fastening / joining and attaching</u> - 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

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

4 QUALITY EDUCATION

3. A surface - a surface has a number of functions, such as 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.
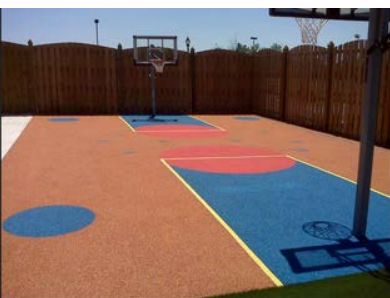
Safety surfaces can be both decorative and functional. They often use bright colours and recycled materials from other processes. They can be highly durable and so reduce maintenance.

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, easily cleaned and pleasurable to look at.

SDG4 P2P: L6WS READY, SET, DESIGN

Ready Set Design - is quick fun and a great introduction to Design Thinking and related skills - teamwork, innovation, and creativity. As a strategy, it can be used in multiple classes using readily available recycled materials.

1. Ready - Share out challenge cards - these are open-ended questions that set the learners their design challenge - depending on the age or the purpose you can scale the complexity of the challenge

Challenge Card:

Using only the materials selected / in front of you create something that...

Add challenge
You have 5 minutes to plan with your team and 15 minutes to build.

2. Set - either have students select or give them three materials from each of the following types

   a. A fastener - e.g. paper clip, string, elastic band, safety pin, pipe cleaner
   b. A surface - e.g. paper, card, material, tin foil
   c. A structure - e.g. empty bottle, box, paper cup, plate, stick

3. Design - students have 20 minutes to design.

On completion ask students to talk about their ideas and thinking. Ask the other groups to contribute:
   - How would they help them?
   - What might be the next stage of the project?
   - If this was to be developed, what are the issues they should consider e.g. users' needs, surveys, market research?
   - Is there anyone local that they could talk to if this was a real project?

SDG4 P2P L6WS CREATING A CONCEPT STATEMENT

4 QUALITY EDUCATION
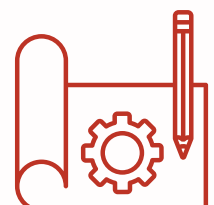
What is a Concept Statement?

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 The Ice Cream Olympics event, game or Ice Cream flavour.

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1. Define the need in two sentences

You are developing The Ice Cream Olympics event, game or Ice Cream flavour for... Who? (tell us about your attendee / player / consumer). To do what? (This is the purpose of the event, include your specific theme / SDG focus).

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

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3. Your people / person's needs - tell us about your user and their needs from your solution

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

SDG4 P2P: L6WS CREATE A VISION / MOOD BOARD

Develop the central message this is an image that will represent your business idea.

Keep it colourful and visual Our brains love images.

STEP 1 THE 'WHAT' OF YOUR BUSINESS
Develop an image that represents the reason for your business - the 'problem' you want to fix. Use pictures, texts or quotes that help you tell what your business is.

STEP 2 THE 'WHY' OF YOUR BUSINESS
Develop an image that will show what your business will provide for people or fix their problem. Use pictures, texts and quotes that help you show how your business helps your customers.

STEP 3 THE 'WHO 'OF YOUR BUSINESS
Develop an image of the people who will use your business. Use pictures, texts, quotes, statistics that help to you define your customers.

STEP 4 THE 'HOW' OF YOUR MARKETING
How will you reach your customers? Use pictures, texts and quotes, that help you tell the reason for our business.

Use can use Pinterest, Google images, cut out images and texts from magazines and drawings

Vision board examples on Pinterest.

https://www.pinterest.ie/scrappinm ichele/vision-board-samples/? lp=true

SDG4 P2P: L6WS CREATE A VISION / MOOD BOARD

Will it be one large poster, a book or four sections - one for each section of your project's idea?

STEP 3 PLANNING YOUR BOARD
As a group you can start to plan the size, shape and format of your vision board - see examples but don't be limited. It should reflect your project.

REMEMBER MESSAGE AND AUDIENCE
1. Will they read left to right?
2. Will you direct them how to read using arrows or numbers?
3. Will your central idea be the biggest image?

STEP 2 DECIDE ON WHO WILL DO WHAT
Each person should in the group should be responsible for one of the four sections in the image board worksheet.

STEP 5, ORGANISE YOUR INFO
You can organise the sections in different ways - think about your audience - who are you trying to reach? Look at examples of posters, communication for that audience.

STEP 1 MATERIALS
You can choose to do your vision board online but if you make it you will need to gather card board, card /paper, glue, scissors, images.

STEP 4 GATHERING IMAGES
Begin to gather images that tell the story of your project - you can use drawings, cut outs, images printed from Google or Pinterest or if digital, you can scan your images online.

SDG4 P2P: L6WS CREATE A VISION / MOOD BOARD

CREATING A DIGITAL VISION BOARD USING CANVA

Step 1: Gather and share your digital Images

When you have decided who is working on what section – gather your digital images and save them all together in a folder. You can create and use a shared drive folder to work in a group.

Step 2: Open an account in Canva

https://www.canva.com/

Step 3: Open a new design in Canva

Once you're signed in, you'll want to click "Create a Design," and choose the template you like, perhaps poster or photo collage.

If you plan on printing your vision board, you can choose USE CUSTOM DIMENSIONS. You can see this in the top right of the screen.

Step 4: Import your images into Canva

Problem to Pitch - Project Management

Lesson 7: Design Thinking Stage 5 Test

Subjects: Science, Design, Technology, Maths Environment, Sustainability

Lesson Title and Summary: Design Thinking Stage 5 Test

Evaluating an idea is a key aspect of design thinking. In this lesson, learners will begin the process of testing their ideas with potential users. Learners will understand that this is not the end of the process and that they may learn something that means they might need to return to an earlier stage e.g. Define or Ideate.

Vocabulary: Beta-test, Focus Group, Lean Canvas, Refine

In this lesson, the learner will:

- explore how to test ideas
- use their vision board
- complete a lean canvas
- prepare to present their ideas

Materials:

- Worksheet: Zone Mapping
- Worksheet: 5 W's of Business
- Worksheet: 8 W's of Business
- Worksheet: LEAN Canvas
- Pens, Pencils
- Paper
- Completed prototype vision boards - Lesson 6
- Stakeholder mapping worksheet - Lesson 1

Activity Instructions

Activity 1 Testing – Rapid Response (15 mins)

1. Watch Video: Design Thinking - Test (see Media Box).
2. In groups, working with their prototypes and their concept statements from the last session consider who you will need to speak to in terms of your audience / user.
3. Learners can also use the Zone Map worksheet to map their 'stakeholders' now that they have a prototype for a clear project idea.

Activity 2 Testing your Prototype – Rapid Response (35 mins)

1. Ask learners to complete Worksheet: 5 Ws of Business to complete a lean canvas.
2. Learners focus on their selected problem area using Worksheet: Rapid Response and 3D model and their empathy map in combination with the 5 Ws worksheet to complete a lean canvas.
3. For a larger or more resolved project Learners can also extend their thinking about their project by using the 8 Ws of business planning. This worksheet asks slightly different questions as well as similar questions as the 5Ws but from different perspectives.
4. If there is time learners could use the Vision Board worksheet from the last lesson to develop their Lean Canva more visually, if they haven't done so already

REFLECTIVE EXERCISE: 3-2-1

- Three things they feel they have learnt from the tasks
- Two things they found most interesting and would like to explore more One – their opinion they have about the tasks

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

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EXTENSION / REDUCTION ACTIVITIES

Reduction: For a shorter class have the learners watch the video and complete their stakeholder map.

Extension: For a longer class, introduce the Pecha Kucha, Media Communication 3 micro-module to support learners to present and pitch their idea – this can be used as an end of module assessment.

Learners use the lean canvas, stakeholder maps, vision boards and prototypes to produce a final presentation – showing their project and gaining further feedback on their 'pitch'.

Learners could also use the Media Communication Modules 1 and 2 to make a video or poster.

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

Video: Design Thinking: Test [3:19 mins] https://youtu.be/UVEQCNM6X-A

Video: Using a lean canvas [3:35 mins] https://www.youtube.com/watch?v=WqjM2DdgUnA

Video: Rocket Pitch - Introduction to Rocket Pitch [1:21 mins]
https://www.youtube.com/watch?v=3UKzsnWU7-4

Linked Learning:
- SDG 4 Supporting Skills -SDG Web Quest lesson plan, Interview skills
- To focus on SDG 14, combine SDG 4 Problem to Pitch with SDG 14 Problem to Pitch Marine Plastic Waste micro-module lesson plans and worksheets
- Communication Skills and Media Communication Skills micro-modules support the development of the 4Cs skills - Creativity, Communication, Critical Thinking and Collaboration

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Local Trip / Expertise / Additional Work and Assessments

- Pitch their final idea to a Local Development company or Community and Business Alliance
- Visit from Local Enterprise Office.
- Create a local enterprise event / exhibition to share their work e.g. in school end of school year, in the local library or online.
- Develop a Rocket Pitch event – create a start-up event, link with other schools in your area, province or across Ireland and beyond.

SDG4 P2P L7: ZONE MAP EXERCISE

A zone map allows us to start from ourselves Zone 0 (our project or our town) and include other people, places or things in relationship to ourselves Zone 1 - 5
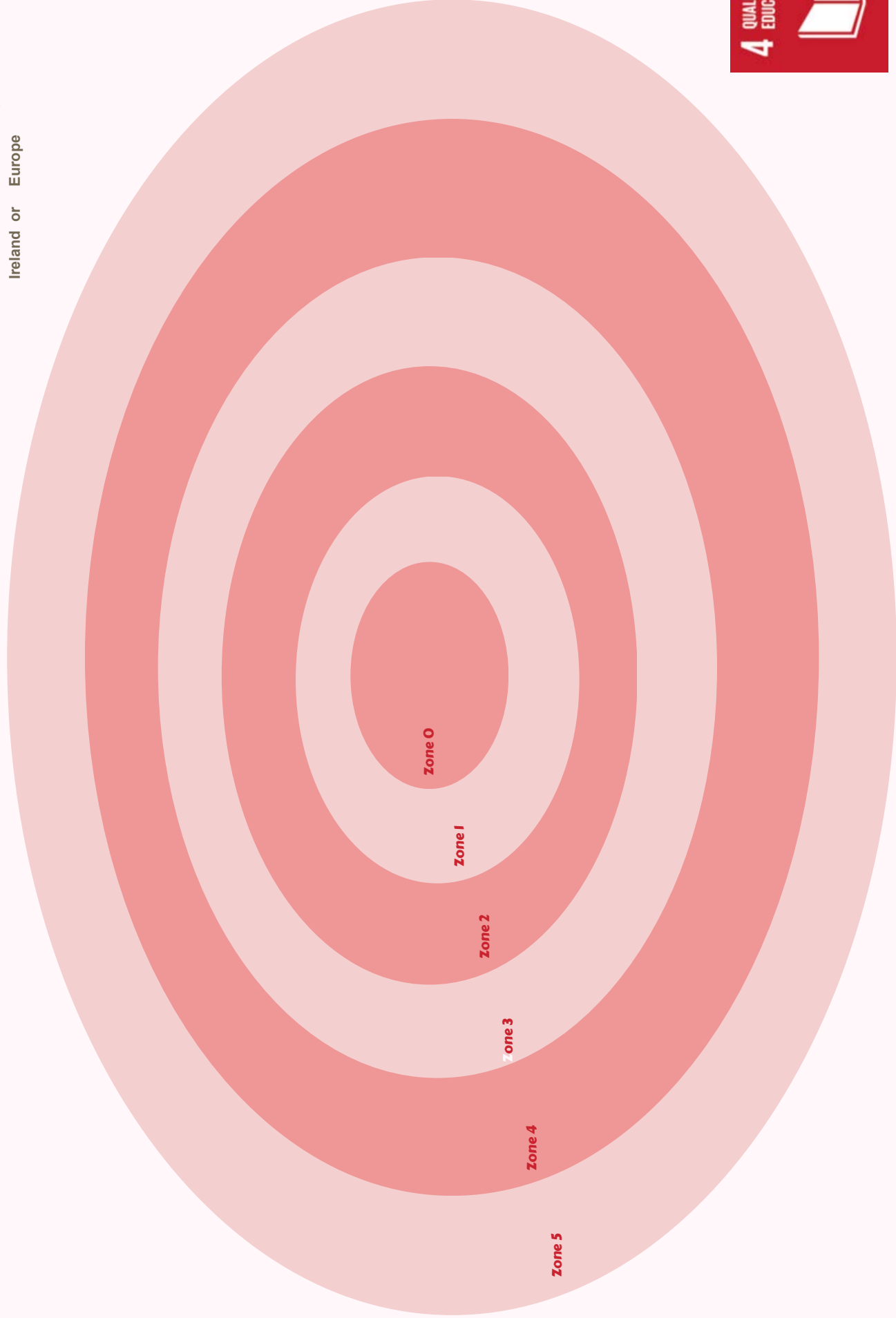
Zone 0 - the self, the project

Zone 1 - Location of project e.g. school or town

Zone 2 - Location of school or town

Zone 3 - Location of town e.g. Iveragh, Kerry

Zone 4 - Location of county e.g. Munster or Ireland

Zone5 - Location of province or country e.g. Ireland or Europe

Zone 0

Zone 1

Zone 2

Zone 3

Zone 4

Zone 5

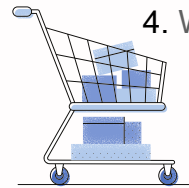# WHAT WHY WHO WHEN WHERE

4 QUALITY EDUCATION

1. WHAT Is the problem?

Give 3 reasons for your business, product or service

2. HOW does your solution 'fix' the problem?

3. WHO will use your solution? Think of 2 - 3 users

4. WHY should anyone buy / use your solution?

5. WHERE / HOW will you reach your customer?

6. WHAT resources do you need for your business?

WHAT WHY WHO WHEN WHERE

7. WHAT will it cost?

8 WHAT is the investment? How will you make the money you need to fund your solution?

9. WHEN should this be done?

10. WHEN / HOW will you know you are successful?

11. WHAT do you need to do next?

4 QUALITY EDUCATION

1. WHAT are you planning to do?

2. WHY do you want to do this project? WHO will benefit?

3. WHEN and WHERE will the activity take place?

Date: _ _ _ _ _ _ _

Time: _ _ _ _ _ _ _ _

Location: _ _ _ _ _ _ _

4. WHAT funds are needed to do this activity?

4 QUALITY EDUCATION

5. WHO needs to approve this project

8 WHAT kind of publicity is needed? WHEN?

Type of publicity   When needed?

1.
2.
3.
4.

7. WHO will do the WORK?

1 Task	3 Task
Person Responsible	Person Responsible
Date Due	Date Due
2 Task	4 Task
Person Responsible	Person Responsible
Date Due	Date Due

8. We're Done!! Was it Worthwhile?

WHAT went well?   WHAT didn't go well?

WHAT would you do differently next time?

WHO needs to receive a thank you note? Name WHO will write it?

Problem
List your customer's top 3 problems

-worry that pet will get lost
-worry that pet is up to no good when home alone
-miss pet and want a way to connect while at work

Existing Alternatives
List how these problems are solved today

There are various collars on the market that track your pet's location. Some track steps and various other stats. There is a separate camera device that can be worn by your pet, but nothing exists that works as a GPS, camera and communication device in one.

Solution
Outline a possible Solution for each problem

worry that pet will get lost-you will be able to track your pet at all times.
worry that pet is up to no good when home alone-you will be able to see what your pet is doing at all times.
miss pet and want a way to connect while at work-you will be able to connect using your voice while you're away

Key Metrics
List the key numbers, that tell you how your business is doing

Number of units sold.

Unique Value Proposition
Single, clear compelling message, that turns an unaware visitor into an interested prospect

Love Paws makes it possible to be with your pet even when you're away.

High Level Concept
List your x for y analogy (e.g. youtube = flicker for videos

Love Paws is the Nest of pet tracking devices.

Unfair Advantage
Somthing, that can't be easily copied or bought

I am Cesar Milan, world famous dog trainer and I have my own TV show and numerous celebrity clients.

Channels
List your path to customers

Give away for free to celebrity pet owners and celebrity TV personalities on Animal Planet, then do a billboard, print and web and social media campaign.

Customer Segments
List your customer segments and users

Ideal customers are middle to high income, tech-savvy pet owners who spend a significant time away from their pets.

Early Adopters
List the characteristic of your ideal customer

Early adapters are pet owners who love to keep up and own the latest tech innovations as soon as they come out.

Cost Structure
List your fixed and your variable costs

Product design, sourcing of materials, production costs, engineering, marketing, PR.

Revenue Streams
List your sources of revenue

We will initially sell online with the goal to being on the shelves of major pet stores by end of year.

PRODUCT   **MARKET**

4 QUALITY EDUCATION

SDG4 P2P: L7WS LEAN CANVAS

4 QUALITY EDUCATION

PROBLEM
List your top 1–3 problems.

EXISTING ALTERNATIVES
List how these problems are solved today.

SOLUTION
Outline a possible solution for each problem.

KEY METRICS
List the key numbers that tell you how your business is doing.

UNIQUE VALUE PROPOSITION
Single, clear, compelling message that states why you are different and worth paying attention.

HIGH–LEVEL CONCEPT
List your X for Y analogy e.g. YouTube = Flickr for videos.

UNFAIR ADVANTAGE
Something that cannot easily be bought or copied.

CHANNELS
List your path to customers (inbound or outbound).

CUSTOMER SEGMENTS
List your target customers and users.

EARLY ADOPTERS
List the characteristics of your ideal customers.

COST STRUCTURE
List your fixed and variable costs.

REVENUE STREAMS
List your sources of revenue.