

Total time	Age range
8-10 hrs	8-14 years



Designing for Climate Action! A Circular Economy Project





World Largest Lesson has developed these resources and included recently developed design tools from the Delft University of Technology and partners.

You can find more information on Your Turn toolbox following this [link](#).

The design skills that we defined for assessment were based on a toolkit for formative assessment “Make Design Learning Visible” that will be published in 2021, also from TU Delft and partners.

With very many thanks to Miroslava Silva, Remke Klapwijk and the International School of Delft for resource support and creation.

Note to Educators:

Welcome to World’s Largest Lesson’s Design Thinking Project, created in partnership with TU Delft University of the Netherlands.

We hope you enjoy this project, which has been designed to last approx 10 hours. In it, students will be introduced to Design Thinking and the Design Skills they will employ when creating their innovations. At the end of the project, students are encouraged to host a Science Fair, where they can showcase their innovations to parents and other school community members. However, in light of COVID-19 restrictions, this may not be possible and you will need to follow your local school and government advice.

The Design Thinking Project is split into 10 activities, following the 6 stages of the Design Thinking Cycle below. If this is the first-time using Design Thinking with your students, they may find it slightly harder to begin with. However, the more you are able to repeat the process with your students, the more familiar they will become with the language of Design Thinking.

If you are using virtual teaching then we have created an online [digital portfolio](#) for your students to use.

If you have any questions or comments, please let us know at lesson@project-everyone.org

Learning Goal:

- To understand how students can take climate action using the circular economy
- Students will host a school fair where they can offer repurposed products to the school community.

Learning outcomes:

- To identify the characteristics of the circular economy
- To answer the design question;
“How can I reuse an object in a different way for the well-being of the people in my community?”
- To design a circular economy project
- To present their design project at a school or local event
- To understand why designing for the circular economy is a positive climate action

Required Resources:

- Classroom with chairs and desks.
- Laptop
- Projector
- Sticky notes
- Whiteboard or flipchart
- Colored and white paper
- Pencils
- Crayons or markers
- White board markers

Key Language:

- Environment
- Society
- Economy
- Non-recyclable
- Global Goals
- Climate change
- Circular economy
- Reduce
- Refuse
- Refurbish
- Remanufacture
- Repurpose
- Repair products
- Reuse
- Recycle

An Overview of the Design Thinking Project

Activity	Design step	Description- worksheet	Time
1	Kick-off introduce design problem	Introduction of the design project & to identify who they are designing for	60 min
2	Exploring and formulating the problem	Interview school community with reused/repurposed objects that they would like to see in the school fair	60 min
3	Generating ideas	Brainstorm ideas to design their project using the image brainstorm worksheet	60 min
4	Selecting ideas	Select the design idea using the C-Box worksheet	30 min
5	Conceptualizing Design Ideas	Working to further conceptualise their design idea	30 min
6	Present and feedback	Present it to the class and take feedback on how to improve it	60 min
7	SMART prototyping	Plan and create a prototype for their project - Prototype worksheet	60 min
8	Testing the Prototype	Students work to update and amend their prototypes	30 min
9	Pitch Your Design	Participate in a school fair	90 min
10	Self- Assessment	Formative assessment	30 min

An Explanation of the Design Thinking approach

Design thinking supports giving children their voice, choice and ownership of solutions they come up with based on real problems. This enhances their knowledge and 21st century skills to participate proactively in society.

The students follow a series of the design cycle steps:

STEP	Design step	Description
	Exploring and formulating the problem	As designers they will try to know as much as possible about the problem, the design question should be clear to design the solution.
	Generating and selecting ideas	As designers they will brainstorm as many ideas as possible to find a solution to the problem. The more the better! Then they need to decide which idea best answers the design question.
	Generating and selecting concepts	The concepts are further developed into drafts. The designer thinks about how it looks, how it works and the use of different materials.
	Building a prototype	The design is further developed into a prototype. The purpose of the prototype is to be able to test the design.
	Testing and optimizing	The prototype is tested. If possible, the end user is involved. Testing can be with the complete product or service or just a part of it.
	Presenting	The design is presented. However, this does not necessarily mean that the design is finished. After this the design could continue to be improved.

Activity 1 – 60 mins

Learning Objective:



Explore and formulate the problem

Activate prior knowledge and prepare students for new concepts and skills related to circular economy and climate action.

Design skill:

Develop empathy

We are learning to empathize with others

Think in all directions (Thinkers)

We are learning how to generate many diverse and original ideas by associating and imagining.

Instructions:

1. NB: This teacher's guide corresponds with the deck here:

Slide	Description
2	Name of the lesson and introducing the design cycle
3-5	Learning objectives and big picture of design cycle They can listen to this podcast as an introduction to design thinking. The activity is to explore their environment and spot something new that they haven't seen before. https://www.wevideo.com/hub#media/ci/1889329569
6	The student will answer a self-assessments worksheet that will help them to understand the rubrics of what they will learning during the design project.
7	Bring different objects from home and school and ask them Which of these objects do you think could be? <ul style="list-style-type: none">● reused● regifted● refuse to use if it's a single use object● recycled● repaired● remanufactured● repurposed● biodegraded

8	Show the photo and ask students to brainstorm what they could make from the objects in the image.
9	<p>Explain to students that in this unit we are going to learn about the circular economy. What might this mean?</p> <p>Explain that the purpose of this lesson will be thinking about this question:</p> <p>How can I reuse, repair or repurpose an object for the wellbeing of people from my school community?</p> <p>Watch the circular economy video: https://www.youtube.com/watch?v=A5wn_iinbxw</p> <p>Discuss what they understand as the circular economy after watching the video. How does designing for the circular economy help to fight climate change?</p>
10	<p>Introduce the design question and explain that in this project we will be focusing on:</p> <p>Reuse/ Repair/Repurpose</p> <p>Explain that in the following lessons they will design something answering this question:</p> <p>How can I reuse an object in a different way for the wellbeing of the people in my community?</p>
11	Ask students to make a link to the Global Goals. How could answering this question also help to achieve the Global Goals? Why might it help them to tackle Goal 13 Climate Action?
12	Explain that their design is for a specific group of users that share similar characteristics. Students then decide which group they will be designing for: <i>e.g. teachers/parents/students/babies/their year group.</i>
13	<p>Create a persona to help students identify with the end user. The students have to imagine, draw and describe a fictional person using all the details from the “Persona” worksheet.</p> <p>Use the worksheet of the persona and answer the following questions:</p> <ul style="list-style-type: none"> • Where does he/she live? • What does he/she like to do? • What does he/she not like doing? • Any fun facts about your persona? • What does he/she hope to do? • What does he/she struggle with? – Link to the design problem
14	Example of persona

Learning evidence: Teams of two or three students make the persona.

Activity 2 – 60 mins

Learning Objective:



Generating and selecting ideas.

Interview school communities with circular economy ideas they would like to see in the school fair.

Design skills

Think in all directions

We are learning how to generate many diverse and original ideas by combining associating and imagining.

Make ideas tangible

We are learning how to elaborate ideas and thoughts using a variety of tools such as stories, drawings, models and prototypes.

Develop empathy

We are learning to empathize with others by experiencing the problem, investigate the user's context and actively seeking input and feedback.

Instructions:

Slide	Description
15-16	Explain the purpose of this lesson. Read out the learning objectives with students and go through the design skills they will be using.
17	Explain to students that we are going to interview some adults/other children to understand how we could help answer the Design Question. We are going to ask them: "What could I design with reused materials to make your life better?"
18	Students make a list of things that can be reused, repurposed or repaired and ask people similar to their persona if they like it or not
19	Were there any examples that kept reoccurring? Students share their answers with others and then draw a tally table to identify the most popular objects.
20	Student example of a tally table from previous session

Learning evidence: Completed questionnaire and class tally.

Activity 3 – 60 mins

Learning Objective:



Generating and selecting ideas.

Brainstorm ideas to design their project- image brainstorm worksheet

Design skill

Think in all directions

We are learning how to generate many diverse and original ideas by combining associating and imagining.

Instructions:

Slide	Description
21-22	Introduce activity 3. Brainstorm design ideas. Read through the learning objectives and design ideas with students
23	Make a 3 minutes energizing activity e.g. “Funny mirror”. Here the students have to be in pairs and mirror what the other student is doing. One minute per student. This is important as it helps them to get into the mindset of being creative.
24-25	Introduce the concept of rules for brainstorming. Go through and explain to students. See if they are able to remember them.
26-27	Introduce the brainstorm grid and encourage students to draw all their ideas down. Remind them of the Design Question they are trying to answer. Design Question: How can I reuse an object in a different way for the wellbeing of the people in my community?
28	Ask students to think about the link to the Global Goals. How do their ideas help to take action for the Goals?
29-31	If students get stuck and need more help: Print the slide and use it a worksheet for students to brainstorm their ideas. You can use the images from the brainstorm learning strategy and their own ideas as inspiration.

Learning evidence: The [brainstorm](#) grid with ideas

Activity 4 – 30 mins

Learning Objective:



Generating and selecting ideas

Select the design idea

Design skill

Make ideas tangible

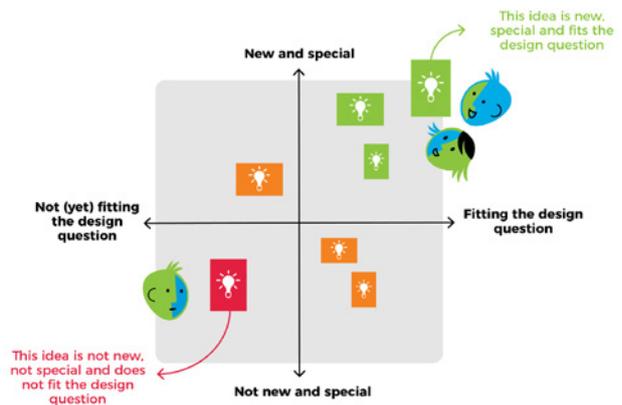
We are learning how to elaborate ideas and thoughts using a variety of tools such as stories, drawings, models and prototypes.

Define your direction

We are learning how to collect, organise and classify information to form an opinion about the essence of the problem and the desired quality of the solutions.

Instructions:

Slide	Description
32-33	Introduce activity 4. Read through the learning objectives and design skills we are using today, with students.
34	Now that they have so many ideas, explain that we are going to zone in on our best idea. Explain that the “Choice box” will help them to identify which idea they want to develop further. We’re aiming for ideas to be in the top right-hand corner. Then it is a new and special idea that also answers the design question.
35	<p>Use this table and write the number of your idea to evaluate how it helps you to answer the design question.</p> <p>In the previous activity each frame had a number use them as a reference to place them where you think they belong. Does working this way help students to assess their ideas?</p>
36	Student example from previous session to guide students



Learning evidence: Choose one design idea with the c-box

Activity 5 – 30 mins

Learning Objective:



Generating and selecting concepts

- Critically analyse their own design to find points of improvement
- Present it to class and get ready to get feedback
- Give feedback in a positive way to other teams to improve their design

Design skills

Define your direction

We are learning how to collect, organize and classify information to form an opinion

Make productive mistakes

We are learning to try out- at the earliest possible stage - our beliefs, ideas and solutions by applying different approaches, techniques and resources. We iterate and use mistakes to learn from.

Make ideas tangible

We are learning how to elaborate ideas and thoughts using a variety of tools such as stories, drawings, models and prototypes.

Make use of the process

We are learning how to switch between different ways of thinking within the design process.

Instructions:

Slide	Description
37-38	Introduce activity 5 Read through the learning objectives and the design skills required with students
39	Explain to students that they will conceptualise their idea. Introduce the activity and explain they will use a worksheet to: <ul style="list-style-type: none"> - Make a slogan - Describe your design idea. How does it work? What is happening? - What makes this idea stand out from everything that already exists? - Where will your solution be used? - Who can use this solution? - Is your design as sustainable as possible? - How is your design using wasted materials?
38	You can print this slide or if they are using the digital portfolio they can make a text box to write their ideas. Explain to students that they should take their time to answer the questions and ask for support and feedback from peers. 

Learning evidence: Presentation

Activity 6 – 60 mins

Learning Objective:



Generating and selecting concepts

- Critically analyse their own design to find points of improvement
- Present it to class and get ready to get feedback
- Give feedback in a positive way to other teams to improve their design

Design skills

Sharing ideas

We are learning how to formulate effective feedback through a standard routine.

Instructions:

Slide	Description
41-42	Introduce activity 6 Read through the learning objectives and design skills with students
43	Explain to students that they will share their design idea to get feedback from other teams. Introduce the activity and explain they will: <ul style="list-style-type: none"> › Letting go - Share your own ideas: find the balance between letting go and staying true to an own idea › Complement each other – Be open to each other’s ideas, complement and help each other. › Outward - If possible, involve people with various backgrounds (inside and outside the process) for feedback, support and guidance. Inspire others. Students work through the activity sheet to scaffold their presentations.
44	Students spend some time practicing their presentation pitch.
45	Divide the class into groups and ask them to pitch to each other. Remind students that today’s lesson is about the value of feedback and helping to support students give meaningful feedback.
46	Go through the feedback report as a class first. Then ask students to fill out on their own after listening to different pitches. <div style="text-align: right; margin-top: 20px;"> </div>

Learning evidence: Presentation and [feedback](#) worksheet

Activity 7 – 60 mins

Learning Objective:



Building a prototype

Develop the design into a prototype.

Test if it answers the design question and if necessary, optimise the prototype

Design skills



Share ideas

We are learning how to express and present our ideas

Make productive mistakes

We are learning to try out- at the earliest possible stage - our beliefs, ideas and solutions by applying different approaches, techniques and resources. We iterate and use mistakes to learn from.

Make ideas tangible

We are learning how to elaborate ideas and thoughts using a variety of tools such as stories, drawings, models and prototypes.

Make use of the process

We are learning how to switch between different ways of thinking within the design process.

Instructions:

Slide	Description
47-48	Introduce Activity 7 Read through the learning objectives and design skills with students
49-50	Introduce SMART prototyping and what it means Check student understanding Go through the activity sheet together as a class first
51-53	Go through an example prototype together. Ask students to spend time thinking about the questions to understand what the student was trying to create.
54	Ask students to begin building their own prototypes.
55	Stop the lesson for students to share top tips on what was working when building their prototypes.

Learning evidence: Test the prototype and start planning for the circular economy fair.



SMART Prototyping Tool

Name of student(s): _____

Name of design: _____

Specific

What is the design? _____

Who will use it? _____

Where it will be used? _____

How does it work/look? _____

Measurable

What is the real size? _____

What is the prototype's size? _____

Assignable

Who is in charge of materials? _____

Who is documenting (notes, pics)? _____

Who is presenting? _____

Realistic

Write the resources you need to make the prototype

Time

Plan your time to make the prototype

Step_ (time) Description

Step 1 () _____

Step 2 () _____

Step 3 () _____

Step 4 () _____

Step 5 () _____

Step 6 () _____

Activity 8 – 30 mins

Learning Objective:



Test the prototype

Test the design into a prototype.

Test if it answers the design question and if necessary, optimise the prototype



Design skills

Make productive mistakes

We are learning to try out- at the earliest possible stage - our beliefs, ideas and solutions by applying different approaches, techniques and resources. We iterate and use mistakes to learn from.

Make ideas tangible

We are learning how to elaborate ideas and test them to answer the design question.

Make use of the process

We are learning how to switch between different ways of thinking within the design process.

Instructions:

Slide	Description
56-57	Introduce Activity 8 Read through the learning objectives and design skills with students Ask why testing our prototype is important?
58	Ask why testing our prototype is important?
59	Ask students to think about whether their prototype answers the Design Question.
60-63	Take students through an example of a prototype created by a student called Maria. She was trying to make her mum's feet less swollen when she came back from work. However, in her initial prototype she made the socks too small for adult feet. Guide students through the examples for them to identify and understand the iterations Maria took with her final design.
64	Give students the remainder of the lesson to test their prototype.

Learning evidence: Build a prototype of your design.

Activity 9 – 90 Mins

Learning Objective:



Presenting the prototype

Show how their designs helps to answer the design question

Design skills

Share ideas

We are learning how to express and present our ideas

Make ideas tangible

We are learning how to elaborate ideas and thoughts using a variety of tool such as stories, drawings, models and prototypes.

Instructions:

Slide	Description
65-66	Introduce activity 9 - Use a poster to present the design idea Read through the learning objectives and design skills required with students
67	<p>Students work through the solutions pitch worksheet to understand how best to present their ideas.</p> <p>They practice their presentation and present it if possible at a circular economy fair at school or they can also make a video to present it remotely.</p>
68	Ask students to spend some time thinking about how they can include the Global Goals into their solutions pitch.
69	Ask students to brainstorm and think about where / who they might be able to pitch to. This project was initially designed to be done as a school fair, however, owing to COVID-19 restrictions this may not be possible. Students may want to organise an online presentation or design a fair with responsible social distancing in place.
70	Look at examples of students with their pitches at a school fair. Does this help students to come up with and desing their own stands?

SOLUTION PITCH
PRESENT YOUR DESIGN

Instruction: Describe your design and create a story with it. Use the help sentences to make the story and make drawings with them.

Your name: _____
Date: _____

Start →

1. The name of the design idea

1. The name of our design is: _____

2. The problem and the context

2. Once upon a time there was a.....
Who was at _____

With this design we want to give a solution to.....

3. The problem is.....
(user)..... was feeling..... about (the problem).....

3. The feelings of the person with the problem, the negative experience

4. The design

4. The solution is.....
It looks like.....

5. The solution works by.....

5. How the design functions

Learning evidence: Present their design at the circular economy school fair/market
Stand sharing the design pitch solution and poster

Activity 10 – 30 mins

Learning Objective: Self-assess the design project

Slide	Description
71-72	Introduce activity 10 Read through the learning objectives and design skills required with students
73	Ask students to think about: Why might it be important for us to do a self-assessment?
74	Answer the self-assessment and compare it to the first self-assessment. Reflect on how their learning has changed, what did they enjoy learning and what they would do differently next time.

Instructions: 1. Answer the following self-assessment

Rubric	Beginning	Developing	Mastering	Feedback
Be able to develop empathy with others	I am able to develop empathy by identifying patterns in the problem and draw conclusions of the problem with the teacher's support.	I am able to independently develop empathy and mention at least one problem with the teacher's support.	I am able to independently develop empathy and find two or three patterns in the problem.	
Be able to analyse the problem-solution in a context	I am able to generate novel ideas considering new perspectives to solve the design problem with the teacher's support.	I am able to generate novel ideas considering new perspectives to solve the design problem and brainstorm solutions in different contexts.	I am able to independently generate novel ideas considering new perspectives to solve the design problem.	
Be able to plan a sequence of steps to design a prototype to solve the problem	I am able to plan and organize time and tasks to make the prototype working with a variety of tools and materials with the teacher's support.	I am able to plan and organize time and tasks to make the prototype working with a variety of tools and materials with some accuracy.	I am able to independently plan and organize time and tasks to make the prototype working with a variety of tools and materials.	
Be able to present your design	I am able to use design language to communicate the design idea with the teacher's support.	I am able to use design language to communicate the design idea with some accuracy.	I am able to independently use design language to present the design idea.	

Learning evidence: Self-assessment worksheet