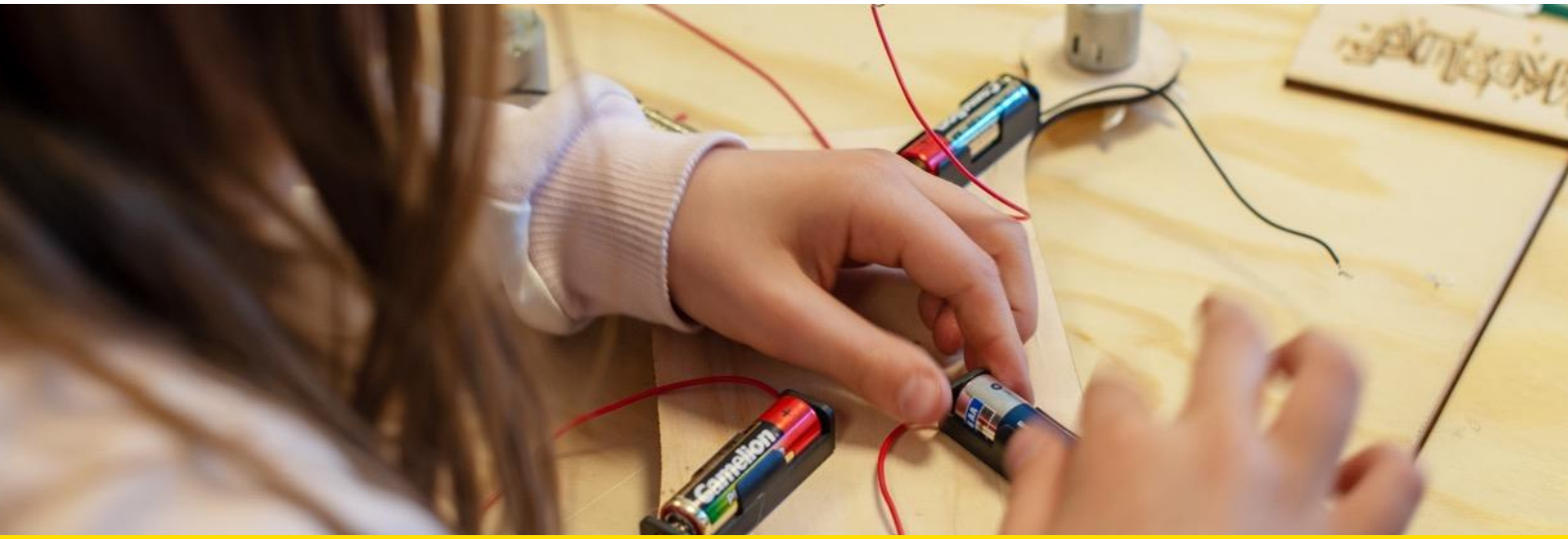
Entrepreneurial skills
for young social innovators
in an open digital world



Workshop Description

CYCLING TOWARDS THE FUTURE

FyXXi

Cycling towards the future (eduCentrum)

The school wanted to use bicycles more often. The students were therefore asked to think about problems they experienced around school and the bicycles, to list and choose some problems, and to try to find and build a solution for them.
First they started by looking at what solutions already existed and then they made a design drawing of their own solution. While they only created a basic prototype, the process did include a few iterations. The final

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product was a cardboard prototype with electronics or microcontrollers where needed. They were asked to reflect, rethink and compare their solutions throughout the workshops.

Workshops: 8 sessions of 3 hours, spread over 2 months
Setting: Freinet-based secondary school, 1st grade
Group size: 4-5 children per group
Age: 11 – 13 years old

Objectives

- ✓ have a better knowledge of basic prototyping skills, use a glue gun, solder
- ✓ come up with a solution to a problem and work out how to make it real
- ✓ iterate using a creative design process
- ✓ fail and start again
- ✓ use math to measure accurate dimensions and use geometry in real life
- ✓ learn to work and plan in groups for different phases of a prototyping project
- ✓ know how waste can be a valuable resource
- ✓ visualise ideas
- ✓ feel empowered through building hands-on
- ✓ feel creatively stimulated

Preparation

We mainly built cardboard prototypes, so we provided lots of large cardboard sheets. We also try to encourage using waste material, so empty boxes, rolls, cups, ... were also present.
We used cutting knifes, scissors, cutting mats, hot glue, contact glue, different kinds of tape (e.g. electrical tape in different colors can be used to decorate), pens, markers, ... We also had some LEDs, electrical wire and soldering tools, and some Micro:bits for those who wanted to use them.

We provided each group with a tablet to use for documenting and taking pictures/video and to look things up on the internet. In our case we had 10 groups, so we needed10 tablets. Each tablet had a number, so each group could use the same tablet each time.
All tablets were connected to Wi-Fi and had the seesaw app (https://app.seesaw.me) installed and configured to the correct group for posting the documentation to their online journal.

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We printed 1 A3 brainstorm poster (0XX_C019: Brainstorm Find your problem), 1 A3 Design poster (Z_converted to C020_(0XX_C021: PROTOTYPE - Design)), and 1 A3 Marketing poster (C005: Marketing Poster) for each group, though we made sure to have some extra. We also provided some extra blank papers to use as draft or take notes on.

For the workshops, we divided the group into small groups of 4 or 5 children. The children worked in the same group throughout the sessions.

For the hands-on introduction Micro:bit and Tinkercad workshops we used 1 laptop and Micro:bit for each child, although you could have them work in pairs as well.

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Session 1: Introduction and brainstorming (130 min)

The goal of this unit is to sensitize and let the students explore the theme and pinpoint problems on their own. They define problems and also try to think up possible solutions for them.
We introduced the DOIT project and theme of the workshop sessions. In this case the school had asked to limit the theme to bicycles, and the use and the safety thereof. We also talked about working together, dividing tasks, prototyping and documenting, ...

Introduction – 20 min

We explained the DOIT project and what we would do in the next workshop sessions. We also talked about the topic, in our case the school bikes and safe usage of them.

Brainstorm – 50 min

The students used the A3 posters to write/draw 3 possible problems and 3 possible solutions.

Share and give/get feedback – 60 min

Each group presented their problems and solutions. We also allowed comments and feedback to chosen topics.
As a facilitator, at this stage you should point out recurring problems and similarities.

Session 2: Micro:bit and Tinkercad workshop (180 min)

The main goal of this unit is to let them know what is possible with micro controllers or CAD/3D-design, and to learn to think with code and electronics or visualize things in a 3D setting. They also learn how to design things that can be printed or fabricated digitally later.
We started with a hands-on introduction of Micro-bit and Tinkercad. You can use one of the many tutorials or workshops to be found online. We also let them take some time to research the problems and solutions they selected in the previous session.

Micro:bit introduction – 150 min

The students got to know Micro:bit and how to use it in groups of around 25 students (parallel with the introduction below).

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Tinkercad introduction and bicycle design – 150 min

The students learned how to design things in 3D in groups of around 25 students (parallel with the introduction above).

Research/history board – 30 min

online_F017: History board (Activity description)
The students researched pre-existing solutions to their problem in their small groups.

Session 3: Prototype design (180 min)

The goal of this unit is to start the iterative prototype process. We focused on working together, dividing tasks in the group and on creating. At each step of the process we include reflection and feedback moments to keep adjusting and fine-tuning the prototypes.
The first step was to choose one of the solutions and make a more detailed drawing of how the prototype could be made. The students also started documenting their process, using the seesaw journal app.

Instructions on how to use the SEESAW-app – 10 min

The students learned to document their own process in a group journal (*https://app.seesaw.me*).

First prototype design – 100 min

Let the students make a detailed drawing of the prototype on A3 paper.

Reflecter and adjust/remake design drawings – 50 min

Show and tell/feedback – 20 min

Each group presented their design poster and briefly explained what they were going to make. We also allowed time for questions or comments.

Session 4, 5, 6: Cardboard prototype building (180 min x 3)

In these sessions we did the actual building of the prototype in cardboard and other easy to find household materials. We focused on creating, working together, dividing tasks in the group and learning from mistakes. We repeated this session three times.

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Cardboard prototype building – 90 min

Reflect and finetune or redesign – 60 min

Show and tell/feedback – 30 min

Session 7: Reflect on the process and promo (180 min)

In this unit the focus was more on the sharing and promoting of the created prototypes. The students started thinking about how to promote their product and made a marketing poster for it.
We also asked the teams to think a little about the process they went through and to make a short video explaining what they did and how they experienced it.

Designing and making a marketing poster – 60 min

online_0_C005: Marketing Poster (Printable worksheet)

Reflecting on the process and making a scenario for a short movie – 30 min

Making a small video about the process and uploading it to the Seesaw journal – 60 min

Show and tell/feedback – 30 min

Session 8: Presentation and exhibition (180 min)

The main goal of this unit is to show other students and parents what we made.
We printed out all journals as a booklet, exhibited all the prototypes together with the brainstorm and design drawings.
The students could answer questions and explain what they did.

Prepare for presentation – 60 min

Presentation to a bigger group of around 80 students and parents – 120 min

Each group presented their product and marketing poster in a fair setup. Questions were asked about the how and why of their project.

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