



Erasmus+

Report of educational activity

Title of activity	Nerdy Derby
School level	General Secondary education
Date	May 2019, 4 hours
City/Country	Antwerp, Belgium
Teaching subject	Technics
Number and age-range of students	20 pupils aged 13 years old
Working language	Dutch
Type and duration of activity	Activity in a FabLab, in FabLab + Antwerp Duration half a day, in the afternoon
Level of difficulty	Easy. No technical skill required and a tinkering approach to problem solving.
Learning objectives	Creativity: expression of creativity in a functional object Technical: Building with a varied set of building materials Theoretical: The importance of the center of gravity in stabilisation Technical: Working with wheels and axles Technical: Strengths and weaknesses of different materials Design: Trial and error / Deal with failure Design: learning from failure

<p>General description of activity</p>	<p><i>Provide here a concise description of the educational activity with the students. If the activity is composed by multiple phases then describe each phase in more detail, mentioning what students planned, what they did, what they achieved etc. Mention also any difficulties or challenges</i></p> <p>Details: see workshop description.</p> <p>Adaptations by teacher:</p> <ol style="list-style-type: none"> 1) Focus on Recycled materials, reusing what has been used before. 2) Students had to achieve a clear goal: clear the track as fast as possible, and try to stay on the track during the bump in the road. 3) Students had to not only complete the challenge, but they also had to explain why their car performed the way it performed. That way they also had the intellectual challenge of coming up with an explanation <p>Difficulties: there was a difference between the two tracks, and since one of the goals was to clear the track as fast as possible, this was not good for the fairness of the challenge and the feeling of success the students had.</p> <p>Difficulties: The axles and wheels available had a bit too much friction, making the end result of most of the students disappointing. This lack of a success experience was a demotivator to end this project with.</p>
<p>Learning outcomes</p>	<p><i>Short description of what students learned and achieved</i></p> <p>Learnings</p> <ul style="list-style-type: none"> Understanding of dynamics Understanding of forces Using materials <p>Transversal skills</p> <ul style="list-style-type: none"> Problem solving skills Creativity Ability to communicate on different levels Flexibility Self-regulation
<p>Materials or equipment that are required</p>	<p><i>List of materials or equipment that are needed for this activity</i></p> <p>Cardboard, corrugated cardboard, postcard/promotional materials</p> <p>Straws</p> <p>Wooden skewers</p> <p>Paper clips</p>

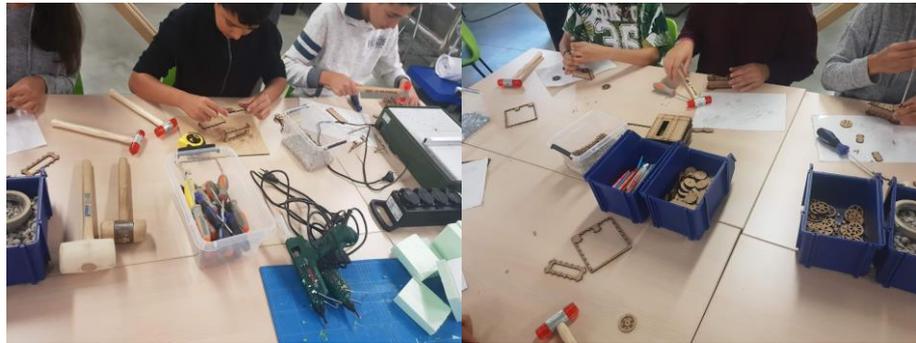
Lasercutted Wheels (MDF)

Wires

adhesive tapes

Photos or other relevant material

Attach here pictures, photos or other relevant supplementary material, such as instructions, worksheets, screenshots or web-links related to the activity



Interview with teachers

Questions about the classroom application

First: collecting metadata about the event

- What workshop was your application based on?
Pinball Workshop
- Number of pupils and their level?
20 pupils 2nd year secondary education (13-14 years). General education (ASO)
- Where did you execute the workshop and what was the timing?
Inside the STEM-lab at school. A series of 5 consecutive Mondays from February until March.

How did it go?

- What went well, what was difficult?

Very positive evaluation. Pupils were very enthusiastic about the subject from the start until the end.

The final designs did fulfill all expectations, with some groups clearly overachieving on the goals.

Difficulties were group-related. Some groups had bad time management and did not complete the full task. Other groups had some in-fighting and were not able to cooperate successfully and an other group did perform excellent on the creativity part of the challenge, but did not comply to all building restrictions as requested.

Did you make changes to the material used in the workshop?

- Were there any challenges in making certain material available?

The workshop has been made a bit more challenging and restrictive than the one presented. Among others because there was more time to complete and some additional technical goals needed to be achieved.

- 1) *The additions were more restrictions for size and measurements of the machine.*
- 2) *The concept needed to differ from the classical pinball machine, the pupils were not allowed to make a 'standard design' without modifications.*
- 3) *The pupils needed at least one automated element in the pinball machine, one piece of electronics that could register a ball passing or similar*
- 4) *The pupils needed to incorporate a 3d printed element in the machine*
- 5) *All materials used needed to be recycled material*

If you look back to the goals of your workshops/lesson, what was the most important part? The knowledge, the attitudes or the competences?

The crucial part was the fact that student had to think before they acted. They needed to visualise and design the product on paper, researching and comparing materials in the 'abstract'. There was a decent amount of time for that, and that was innovative.

There could even be more stress on the fact that they had to stick to their original plan, so that the importance of a good design was even more clear.

Questions about student/pupil skills

What is your expectation of the students after the class

According to you: What were the learning goals?

What are you hoping that they for sure will remember from the session? (see skill list on bottom)

How have you tried to achieve this?

Specific STEM-skills (subject-related)

Using 3D printer

perspective drawings

use of electronics, automatization.

Transversal skills

Willingness to learn

Problem solving skills

Creativity

Ability to communicate on different levels

Being pro-active (very much so)

Sense of entrepreneurship

Being able to work in group

Flexibility

Thinking sustainably about material use

Which level (STEM-ladder) would you say your students have? And how have you tried to improve their level.

Questions about teacher's own skills

What was the biggest challenge /difficulty when you look back at the class you gave?

- Describe two situations where you were confronted with a problem. What was your reaction to this problem?
- *One group was not able to cooperate do to a personal issue*
- *There was no clear defined division of labor among the groups and that led to some inefficiencies. This could be stimulated more*

If you were allowed to choose a seminar to further develop your professional competences for these kind of applications, which course would you choose?

e.g. technically oriented (how to use equipment, tools etc)

or theoretically oriented (pedagogical methodologies)

or assessment focused (how to assess progress and skills acquired by students)

Technical oriented education, specifically the microcontroller environment

Questions about the past workshop

Which two talents or skills do you pre-possess that were useful in these workshops?

organising talent and practical structure

Pro-active anticipation of problematic situations

If you were allowed to choose a teaching assistant for this workshop, what qualities would he or she ideally have?

an assistant with a lot of technical knowledge

According to you, what things should students definitely acquire from this workshop?

Describe also, how did you try to reach this goal?

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Optional: In which way differs teaching in a Fablab from teaching in a traditional classroom?

If possible, mention one or two main advantages and disadvantages in each case.

Inside this STEM-lab there was no shortage of material for the design. This leads among others to a lot of inspiration and creative solutions for problems; pupils are very autonomous.

Overall, if you could change, add or improve one thing in the workshop you attended what would it be?

Better evaluation towards the end of the workshop, more exchange between students about how they approached problems and what they learned