
DOING MORE
TOGETHER
STEAM
IN OULU

Science
Technology
Engineering
Arts
Mathematics

= STEAM

"STEAM is learner-centered, experimental, and collaborative learning that enhances the organizational culture of a school towards collaborative action and the acquisition of knowledge and skills.“

“Learners are involved in designing the projects, and mutual collaboration among teachers is essential. STEAM education succeeds best when it is part of the unit's curriculum work.“

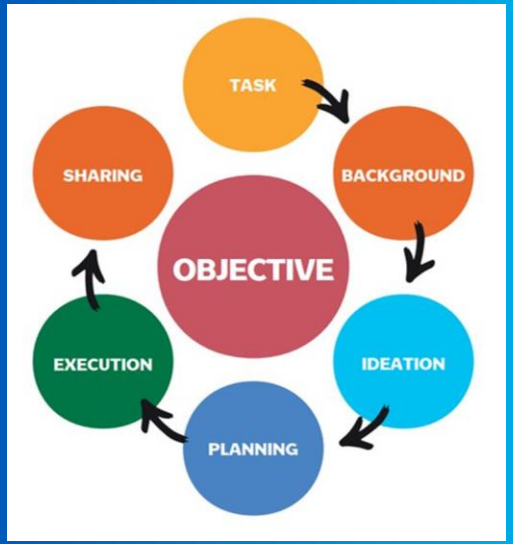
"STEAM PEDAGOGY uses technology, natural sciences, and art as approaches to teach learners self-directedness, interpersonal skills, and critical thinking.“

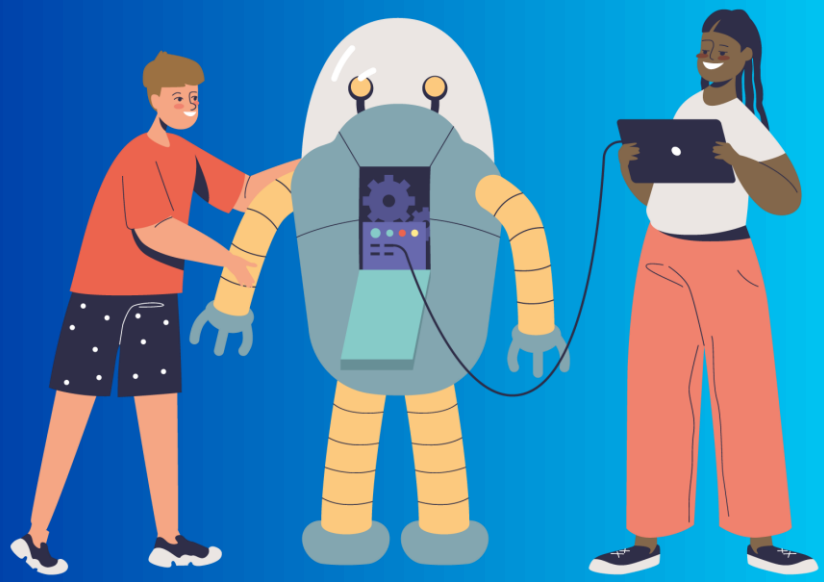
"In education, STEAM involves combining subject groups and technology into broad and interdisciplinary learning entities. STEAM projects can encompass any subjects and skills.“

STEAM process

1. **Objective**
2. **Task**
3. **Backround**
4. **Ideation**
5. **Planning**
6. **Execution**
7. **Sharing**

- recurs in every STEAM implementation
- Applicable to various themes, from product design to knowledge-based education





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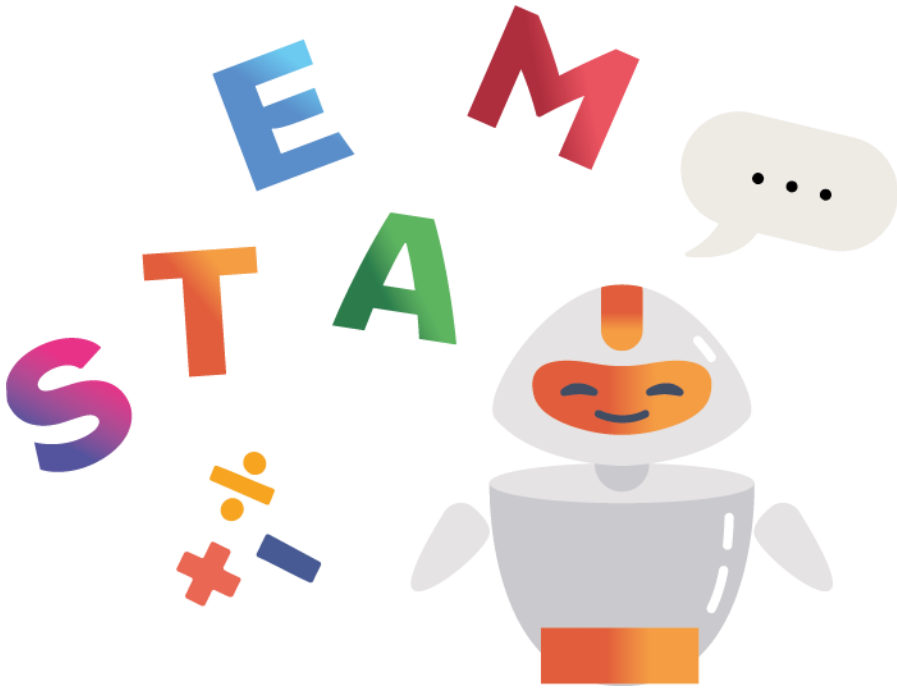
1. Objective

At the center of the process are the learning goals that are set in the planning phase. The goal identifies multidisciplinary knowledge goals and transversal skill goals to which the STEAM implementation is linked to.



Example: Objective

Explore the STEAM process

Familiarize oneself with one Agenda 2030 goal.

2. Task

At the beginning of the STEAM process, we tune into the activity, define and present the period´s theme and/or problem, which can be very broad or strictly limited.

Learners are told the goals defined for the period, what will be done, why and for how long.

Activities usually take place in groups, so it is also important to define the roles and responsibilities within the groups during the task phase. For example, different games, sound or videos can be used as ways to tune in to the project.

Example: Task

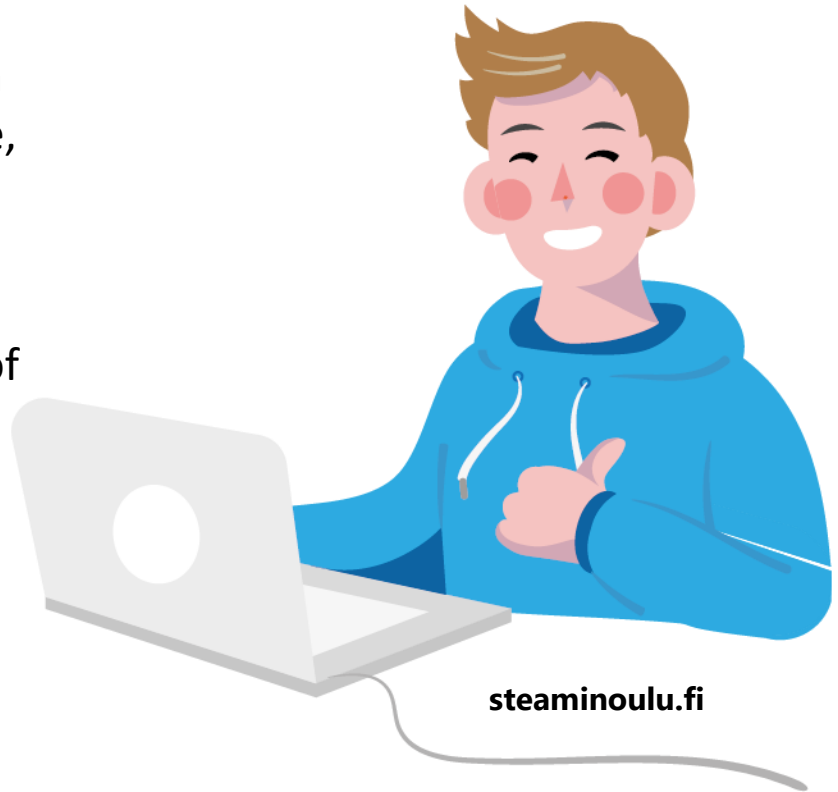
1. The group selects one of the Agenda 2030 goals to make the world a better place.
2. The group builds a device or structure that provides a solution to the chosen goal.
3. In addition, the group selects a superhero with the superpowers required for the task.

3. Backround

In the backround phase learners actively function as collectors of the necessary information and as researchers related to the given theme. They get to explore the matter and build the necessary knowledge base.

The key is that especially children and young people are taught how to form good questions. At first, we find out what kind of information about the theme and the problem already exists. It is good to ensure that learners find and use a variety of information sources. In connection with the observation, for example, you can visit the object and interview other people about the theme.

The observations made by the learners themselves are often used to gather information. As a result of the phase, the learners have a good understanding of the theme or object, possibly the needs of the users and the challenges related to use.



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Example: Backround

The group chooses one goal from these and explores its contents more closely, with the time limit of 10 minutes.

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4. Ideation

In the ideation phase the material collected in the background work phase is utilized. In the groups, we focus on ideation and look for possible solutions related to the task.

The goal is to generate a lot of different ideas, so an open attitude towards all ideas is important, and judging them should be avoided in order to maintain a creative and positive mind.

By combining ideas, they can often become a completely new solution, and the resulting refined ideas are shared by the group.

As a result, the group has developed one or even more solutions, which they take to further development.

Example: Ideation

1. Each group member first individually brainstorms for 2 minutes the craziest, impossible, and impractical ideas.
2. The ideas are then shared within the group.
3. The group forms a collective vision from the ideas for a device or structure, which will be further developed in the next phase.

Consider the chosen AGENDA 2030 goal, the role of the superhero, and the features of the device/building during the brainstorming.

Time: 8 minutes."

5. Planning

In this phase solution ideas can be initially sketched, for example, on paper, what it would look like or how it would work.

The most important thing is to find a design method suitable for your own solution. In planning, it is possible to create so-called light prototypes, which can be used to quickly test the functionality of the solution.

The most suitable versions are selected for the next step. We try to look at our own and others' plans through the eyes of the final user.

In the planning –phase happens the so-called "improving", where the group's own solutions develop by learning from the solutions made by others.

Example: Planning

The group creates a plan, incorporating ideas from each group member.
Sketch how your superhero and their device/building will solve your goal.

Time for planning: 10 minutes.
Prepare to present your plan.

6. Execution

In this phase we make the first more accurate prototype of the solution.

At this stage, the right materials and techniques are used to produce the final solutions.

When the first version of the solution is completed, it is evaluated and feedback is collected.

In the implementation phase, several manufacturing or implementation experiments can be done iteratively until it is concluded that the solution and its production process have been perfected.

Example: Execution

- Take into account the additional tips received from another group in your implementation.
- Prepare a prototype of your device/building within the given time.
- Come up with descriptive names for the device/building and superhero.
- Get ready to present your prototype, superhero, and how it addresses a specific AGENDA 2030 goal and how.

Time: 20 minutes.

7. Sharing

In the sharing phase the groups present their achievements to the others.

In addition to the prototype/solution, the presentation tells what the group has done in the different stages of the process and why.

Repetition implemented in this way helps learners to adopt the process even more strongly. Reflecting on one's actions and decisions is also key in the sharing phase.

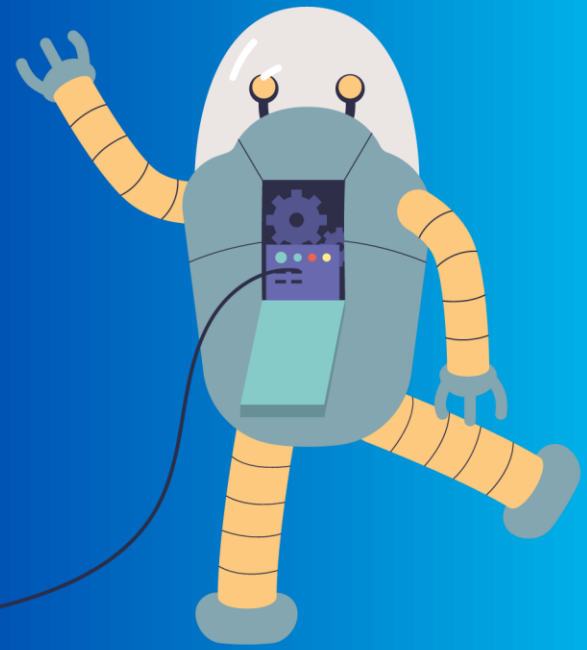
In addition, it is good to practice your own solution, the so-called "pitching". In addition, you can also learn about communication and marketing.

Example: Sharing

Each group presents their creation and reflects on a few highlights of how the process model worked in this task.

For more information visit

https://www.steaminoulu.fi/in-english/



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