 **October 2021**

Name of the STEAM project

TEACHERS’ AND SCHOOL’S NAME

**PROJECT**

|  |  |
| --- | --- |
| PROJECT ACRONYM | STEAMTeach |
| PROJECT TITLE | STEAM Education for Teaching Professionalism |
| PROJECT REFERENCE | 2020-1-ES01-KA201-082102 |
| START DATE | 1st October 2020 |
| KEY ACTION | Cooperation for innovation and the exchange of good practices |
| ACTION TYPE | Strategic Partnerships for school education |
| PROJECT WEBSITE | <https://www.steamteach.unican.es/>  |

**REPORT DETAILS**

|  |  |
| --- | --- |
| VERSION |  |
| DATE |  |
| MAIN AUTHORS’ NAME AND EMAIL ADDRESS |  |
| CONTRIBUTING INSTITUTIONS |  |
| REVIEWED BY |  |
| STATUS |  |

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TABLE OF CONTENTS

[1 PROJECT JUSTIFICATION 1](#_Toc86234987)

[1.1 Project Overview 1](#_Toc86234988)

[2 CURRICULAR CONTEXT 2](#_Toc86234989)

[2.1 Key competences 2](#_Toc86234990)

[2.2 Content 2](#_Toc86234991)

[2.3 Expected learning results 3](#_Toc86234992)

[3 STEPS TO BE EXECUTED 3](#_Toc86234993)

[3.1 Step 1: Identifying the problem 3](#_Toc86234994)

[3.1.1 Constraints 3](#_Toc86234995)

[3.1.2 Criteria 3](#_Toc86234996)

[3.2 Step 2: Generating ideas 3](#_Toc86234997)

[3.2.1 Sub-problems 4](#_Toc86234998)

[3.3 Step 3: Exploring the Science and Mathematics 4](#_Toc86234999)

[3.3.1 Experiment/task 1 5](#_Toc86235000)

[3.3.2 Experiment/task 2 5](#_Toc86235001)

[3.4 Step 4: Designing and Constructing the model 5](#_Toc86235002)

[3.5 Step 5: Evaluating the model 5](#_Toc86235003)

[3.6 Step 6: Refining the model 6](#_Toc86235004)

[3.7 Step 7: Presenting the project 6](#_Toc86235005)

[4 PROJECT EVALUATION 6](#_Toc86235006)

[5 MATERIALS AND ROOMS 6](#_Toc86235007)

[6 INSTRUCTIONS ABOUT THE CONSTRUCTION OF PROTOTYPE/SOFTWARE/OTHER 6](#_Toc86235008)

[7 CONCLUSIONS 7](#_Toc86235009)

[References 7](#_Toc86235010)

# PROJECT JUSTIFICATION

Introducing the project goal and problematic. Try to motivate the project by answering the following questions:

* Why is the project relevant for students?
* In which topic or scientific area is your project framed?

## Project Overview

|  |  |  |
| --- | --- | --- |
| *Participant age:*?? | *No. of participants:*Groups of ?? | *Duration:*?? hours |
| *Level of knowledge:*?? | *No. of teachers:*?? | *Type of venue:*Regular classroom??Laboratory??Outdoor space??…?? |
| *Learning methodologies:*Content integration??Problem-based learning??Inquiry-based learning??Design-based learning??Collaborative learning?? | *Involved disciplines:*Science??Technology??Engineering??Arts??Mathematics?? | *Technological needs:*Computer??Tablets??Mobile phones??Internet??… |
| *Most emphasised learning methodology:*Content integration??Problem-based learning??Inquiry-based learning??Design-based learning??Collaborative learning?? | *Main addressed topics:*?? | *Estimated project cost:*?? € |

# CURRICULAR CONTEXT

## Key competences

Describing the main key competences may be developed during the project development:

* Literacy
* Multilingual
* Mathematical, science, technology and engineering
* Digital
* Personal, social and learning to learn
* Citizenship
* Entrepreneurship
* Cultural awareness and expression

## Content

Describing the content from each discipline that will be addressed when implementing the project

|  |  |
| --- | --- |
| DISCIPLINE | CURRICULAR CONTENT ADDRESSED |
| Science |  |
|  |
|  |
|  |
| Technology |  |
|  |
|  |
| Engineering |  |
|  |
|  |
| Arts |  |
|  |
|  |
|  |
| Mathematics |  |
|  |
|  |

## Expected learning results

Describe what you expect students to achieve after their engagement with the project.

# STEPS TO BE EXECUTED

## Step 1: Identifying the problem

Duration: ??

Teachers introduce the project to students. During this initial step, students working in groups are encouraged to ask the following questions concerning the problem:

* What is the problem?
* Which are the available materials?
* What are the main project constraints? (e.g., time, budget, resources…)
* Which are the criteria that must be met so that the solution is acceptable?

Students will discuss in groups of 3-5 the aforementioned questions. They will collect the group ideas in a portfolio. After the group discussion, the teacher will talk with the whole classroom about their findings, and they will agree on the constraints and the criteria.

### Constraints

Defining constraints for this project

### Criteria

Defining the criteria that the model must meet

## Step 2: Generating ideas

Duration: ??

The main objective of this step is to help students to realise that STEAM workers do not attempt to plan the whole thing at all, as it can comprise many variables. During this step students will work on the following tasks:

* Breaking the main problem to simpler problems (sub-problems)
* Matching materials to each sub-problem
* Organizing the goals
* Devising a strategy about how they will work

Students will work with the same group on responding to these questions. These responses will also be included in the group portfolio. After the group discussion, the whole classroom and the teacher try to bring a consensus on the sub-problems identified.

**Tip for teachers:** If necessary, reminding students of the criteria and constraints identified when defining the sub-problems.

### Sub-problems

Defining the main sub-problems

## Step 3: Exploring the Science and Mathematics

Duration: ??

In this step, students will execute activities or experiments that will contribute to the acquisition of mathematical and scientific content that underlie each sub-problem. During this process, students will be encouraged to make conjectures and to experiment. The main questions that should be investigated to support the mathematical and scientific content in this problem are:

* Question 1
* Question 2
* …

Students will execute the proposed activities in groups, adding to their portfolio the initial findings. After performing the tasks, the whole classroom and the teacher will discuss the scientific and mathematical principles.

Proposing tasks or experiments to investigate those questions.

### Experiment/task 1

### Experiment/task 2

## Step 4: Designing and Constructing the model

Duration: ??

During this step, students will generate as many solutions as possible by brainstorming to solve each sub-problem. The advantages and disadvantages for each proposed solution will be examined in groups, with the objective of achieving the optimum solution. Students will be involved in the following actions:

* Designing the application of the chosen solution with as many details as possible. Sketching the design and making a list with the required materials and tools.
* Following your design and solving each sub-problem.
* Testing whether the solutions of each sub-problem are compatible with each other.
* Making the necessary corrections and improvements.

Each group of students will suggest solutions for each sub-problem and will sketch a design for their project. The designs will be discussed with the whole classroom and the teacher.

## Step 5: Evaluating the model

Duration: ??

In this stage, students must combine the solutions for each sub-problem to obtain the solution for the main problem. They should be encouraged to test the model elaborated, checking the constraints and assess the goal attainment. The teachers may pose the following questions:

* Does it work?
* Does it solve the necessity?
* Does the final design meet the criteria set?
* How could you improve your solution?

## Step 6: Refining the model

Duration: ??

When the solution does not work, does not solve the necessity set, or does not meet the criteria set, it should be improved. The improvement should be executed by reviewing the whole solution process. It may entail, for example, sketching a new design and transforming it to a revised model, modifying the programming code, or working out a mathematical problem.

## Step 7: Presenting the project

This step can be also developed during the project elaboration. Students will disseminate the project in front of an audience (Diego-Mantecón et al., 2021). This audience may comprise classmates, peers from other high schools, families, and researchers.

# PROJECT EVALUATION

Proposing ways to evaluate the expected learning results.

# MATERIALS AND ROOMS

Providing the list of materials and rooms to execute the project. Proposing new ideas when materials are expensive or difficult to find. Estimate the project cost.

# INSTRUCTIONS ABOUT THE CONSTRUCTION OF PROTOTYPE/SOFTWARE/OTHER

If it is necessary please give instructions about how to proceed with the assembling process, programming, or the software.

# CONCLUSIONS

# References

Diego-Mantecón, J., Blanco, T., Ortiz-Laso, Z., & Lavicza, Z. (2021). STEAM projects with KIKS format for developing key competences. [Proyectos STEAM con formato KIKS para el desarrollo de competencias clave]. *Comunicar, 66*, 33-43. <https://doi.org/10.3916/C66-2021-03>