

TEMPLATE for the TEACHERS

★ **Name of the chosen project:**

Design the space of the school patio: outdoor classroom

★ **Subjects covered from STEAM areas:**

- IT programme for construction (students selection)
- Mathematics (Geometry, Proportions, Scales, Symmetry,...)
- Art
- Sustainable Development, Recycling, 3D Printing

★ **Target group (age range and size of the group)**

13-17, whole class

★ **Duration of the activity:**

- two or three workshops in school
- creative and evaluation workshops in the school (one for evaluating learning objectives and one for evaluation and summarizing results and each phase of the process)

Each activity lasts 60 minutes. Preparation for each activity lasts 120 minutes.

★ **Keywords:**

IT, math, architecture, art and physics

★ **Key sentence describing context of the activity, followed by short description (200 words):**

This is a learning activity where students will take their IT skills and design their own classroom outdoors on computer using a computer program for 3D modeling - SketchUp, in a workshop organized with the help of teachers.

Students are creating a classroom that uses 3D, practicing both plane and solid geometry. This project allows for students to practice and apply learned skills in IT and geometry while problem solving and making decisions based on their own knowledge, creativity, and imagination. Students will utilize many types of geometric concepts to create buildings and structures, designing parts of a roof construction, walls with shapes, lines, angles, and incorporating multiple skills at the same time to reach their objectives.

This project is designed to encourage students to create their own space for different activities during school time. While the students are creating, they're also learning important math concepts and using programs for projecting and constructing buildings that will help them throughout life. The project aims to focus on IT geometry, but there are so many other elements of learning present which include inquiry-based learning, problem-solving, collaboration, communication, independent learning, and more. This project doesn't just focus on math skills, as there are components of

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social studies (mapping skills), drawing, making maps, recycling, researching about sustainability, problem solving and comprehension skills too.

★ Description of the activity environment, including the list of materials and tools needed:

Formal activities are performed in the school, in the IT classrooms, where students practice their knowledge about IT and use various programs to create 3D classroom in school yard.

Resources:

- Computer with access to the internet
- Projector
- 3D printer
- Different materials for the model of classroom with wood, plastic, glue, paper...

★ Step by step, detailed description of the activity, including teaching and learning strategies.

- Students engage in a dialog with the teacher and each other about the application SketchUp, in a workshop organized to lean on previously learnt IT modeling concepts
- Students take part in workshops and learn about SketchUp software that they should use in work
- Students draw their imaginary open classroom on art classes
- Students prepare files for 3D printing of their classroom in the yard
- Students learn geometry of construction via printed models and construct model classrooms with provided materials
- Students make proposals for further investigation of the topic

During this scenario, students will explore:

- plane geometry (polygons – triangles, quadrilaterals, circles, angles, symmetry, ...)
- solid geometry
- mathematical properties of geometrical objects and connect to previously gained math knowledge
- aesthetical value of geometry models
- different materials for building construction

★ Learning objectives/competencies:

This workshop describes how to investigate construction geometry with the help of hand-on activities. Described activities can be used for connections between mathematics, IT and art. The workshops could be implemented in regular school lessons as a project. These activities encourage the work of students with special needs and students with weaker opportunities for work through group activities or activities in pairs, which can be applied in IT, art or mathematics and technology classes. Also, with these activities, differences in working with technology, computers and modeling between girls and boys are overcome and a positive atmosphere is created in the classroom.

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The domain specific objectives are:

- Construction with IT software
- IT application for construction models for 3D Shapes
- Learning about symmetry
- Learning about proportions
- Learning about scales
- Learning about recycling and sustainability
- Learning about gender equality and inclusion

★ **Evaluation/Assessment guidelines**

Evaluation is done through informal students' feedback and via formal assessment made by teacher

★ **Lessons learned:**

How to create objects: houses, classrooms, school buildings...

★ **Additional information/Links:**

★ **Contact person:**

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