



Erasmus+

FutureMinds: Cultivating Innovative Leaders in STEAM and Active Citizenship

Project n° 2024-2-BE01-KA210-SCH-000286437

Activity Template

STEAM for a greener Beauraing

School: Institut Notre-Dame du Sacré-Coeur (INDSC), Beauraing

Teacher Name and surname: Erasmus team

Activity objectives:

- Develop the ability to apply STEAM knowledge to a local, real-world sustainability problem.
- Strengthen skills in inquiry, experimentation and design thinking.
- Practice data collection, basic analysis and visual representation of results.
- Foster collaboration, creativity and communication through a collective design challenge.
- Connect personal choices and local environmental issues with wider sustainability and citizenship perspectives.

General framework: This activity is linked with the FutureMinds project's aim of cultivating innovative leaders in STEAM and active citizenship, using a multidisciplinary, hands-on approach where students investigate a local environmental or mobility issue in Beauraing and design a feasible improvement. Integrated STEM approaches encourage learners to connect concepts, experiment with ideas and solve authentic challenges, helping them become future innovators and responsible citizens.

Cross-curricular subjects involved: Science: basic concepts of energy, materials, ecosystems and environmental impact.

Technology: use of digital tools for information search, mapping, simple modelling or presentation.

Engineering: design process (problem analysis, ideation, prototyping, testing, improvement).

Arts: visual design, storytelling, posters, models or digital media to communicate solutions.

Mathematics: measurement, estimation, data collection, graphs and ratios.

Geography/civic education: local territory, mobility patterns, public spaces and participation.

French/mother tongue: written and oral communication, argumentation and reflection.

Material needed to develop the activity:

Large sheets of paper or cardboard, markers, coloured pencils.

Simple construction materials for prototypes (recycled cardboard, paper tubes, string, tape, small boxes, etc.).

Rulers, measuring tapes and calculators.

Access to tablets/computers (optional) for basic research, maps and digital presentations.

Printed aerial map or schematic plan of the school area / nearby streets in Beauraing.

Post-it notes for ideas and feedback.

Timer/clock to manage phases.

Timing:

- 15 min – Introduction and framing (problem + STEAM lens).
- 25 min – Exploration: understanding the local challenge and collecting initial data.
- 70 min – Design lab: ideation, selection of one solution and building a simple prototype/model.
- 30 min – Presentations and peer feedback.
- 40 min – Reflection and consolidation (skills, next steps).

Groups:

Students work in small groups of 4–5. Each group chooses (or is assigned) a specific micro-challenge related to the school surroundings in Beauraing, for example: “safe and green route to school,” “cool and comfortable playground in hot weather,” or “reducing waste around the school entrance.” Groups should contain a mix of strengths (creative, analytical, practical) and each student takes a role (project manager, scientist, engineer, artist, data analyst, communicator).

Procedure to develop the activity:**Introduction: framing the challenge (15 min)**

The teacher presents a concrete local issue (e.g. heat and lack of shade in the schoolyard, litter near a bus stop, unsafe crossing for cyclists) and asks students: “How could we redesign this space or behaviour using STEAM to make Beauraing greener and safer?” Short discussion connects the issue to science (environment), technology/engineering (solutions), maths (numbers) and arts (communication).

Exploration and data collection (25 min)

Groups receive a simple brief of the chosen area/problem and, if possible, go outside or use photos/maps to observe it. They note: current situation, users (students, neighbours, drivers), materials present, possible risks and opportunities. They collect small amounts of data (e.g. count cars vs bikes in 10 minutes, measure approximate dimensions of the space, estimate number of trees/bin locations). Findings are recorded on a worksheet with simple tables or sketches.

Design lab – ideation (25 min)

Back in the classroom, each group brainstorms as many solution ideas as possible,

using Post-it notes and quick sketches. Students are reminded to integrate at least three STEAM dimensions (for example: science-based cooling or biodiversity element, engineered structure, mathematical justification through measurements, and artistic design to make the space attractive).

Design lab – selection and prototyping (45 min)

Each group selects one idea that is:

- environmentally beneficial;
- realistic for the school/community;
- safe and inclusive for users.

They then build a simple physical prototype (model of the space, structure, signage, etc.) or a visual plan (poster, storyboard, digital slide deck) using the materials provided. Students calculate key numbers (e.g. approximate length of a cycle path, number of new trees or benches, costs estimated with symbolic units, or reduction in litter bins distance) and include these on their prototype.

Presentations and peer feedback (30 min):

Groups present their solution in 3–4 minutes, explaining:

- the problem they tackled;
- their STEAM-based reasoning (science, technology/engineering, maths, arts);
- expected impact on environment and daily life at school.

After each presentation, two peer feedback comments are collected: one “plus” (strong point) and one “delta” (idea to improve). Feedback focuses on clarity, feasibility and creativity, not on personal judgement.

Reflection and consolidation (20 min)

Individually, students complete a short reflection:

- What STEAM skills did I use today?
- What did I learn about my town/school and sustainability?
- What is one small action or project step we could realistically propose to the school or municipality?

In plenary, the teacher links these reflections to the transversal competences of creativity, participation and building a sustainable future, and agrees with the class one concrete follow-up (e.g. presenting best ideas to school council, coding a simple digital version of the map, or organizing a mini exhibition).

Competences and skills to be acquired:

Applying scientific knowledge to analyse environmental and social issues in the local context.

Using technology and engineering thinking to design and prototype practical solutions.

Employing mathematics for measurement, estimation and presentation of data (tables, graphs).

Expressing ideas creatively through visual arts and storytelling to engage an audience.

Collaborating effectively in teams with clear roles and responsibilities.

Communicating and arguing for a solution clearly and respectfully in front of peers.

Developing a sense of agency and responsibility for improving the community through STEAM.

Pitfalls and strengths:

Strengths

- High level of cross-curricular integration: students see how science, technology, engineering, arts and maths work together on real local problems.
- Strong motivation due to the concrete link with Beauraing and the school environment.
- Flexible design: the same structure can be reused for different sustainability challenges across the year.
- Builds both hard skills (measurement, prototyping, data handling) and soft skills (communication, teamwork, creativity, civic engagement).

Pitfalls

- Requires careful time management; prototyping can easily take longer than planned, so clear intermediate checkpoints are needed.
- Some students may focus mainly on artistic aspects while neglecting the science or maths; the teacher must keep the STEAM balance explicit.
- Outdoor observation and measurement are weather- and logistics-dependent; a backup scenario using photos/maps should be prepared.
- To move beyond “just a school exercise,” at least one follow-up step (sharing solutions with decision-makers) should be planned; otherwise, students may feel their ideas are not taken seriously.