STEAME ACADEMY
TEACHING FACILITATION LEARNING & CREATIVITY PLAN (L&C PLAN) - LEVEL 1
STUDENT TEACHERS: ART FOR CLIMATE CHANGE AWARENESS

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1. Overview

Title	Art for climate change awareness
Driving Question or Topic	How can we raise awareness about climate change through an art installation? How can we represent climate change-associated meteorological alterations through an artwork? How can we build an artwork in a collaborative way?
Ages, Grades, …	11-12
Duration, Timeline, Activities	4 hours 60 minutes class 4 activities
Curriculum Alignment	Natural sciences, Technology, Arts.
Contributors, Partners	Students, teachers
Abstract - Synopsis	This project allows students to explore the idea of making a piece of art as a creative way to raise awareness about climate change, especially focussing on its meteorological effects. The project integrates various STEAME areas and encourages collaboration, connection with the community, and creativity.
References, Acknowledgements	This L&C plan is based on a project developed in LabTED!, a digital innovation shuttle by the University of Barcelona.

2. STEAME ACADEMY Framework*

Teachers' Cooperation	● Natural sciences Teacher: content knowledge about climate change. ● Technology Teacher: Support in the use of digital and electronics tools ● Arts Teacher: Guidance in creating artistic projects
STEAME in Life (SiL) Organization	● Possibility to arrange meetings with local artists or art schools to discuss the significance of art in society and how it can influence public opinion, politics, and dive into action. ● The artworks can be exhibited in local, regional or national science and sustainability fairs.
Action Plan Formulation	Preparation (by teachers) ● Curriculum Integration: Align the project with curriculum goals across subjects. ● Resource Gathering: Collect necessary materials and tools. ● Planning Sessions: Organize meetings among teachers to outline responsibilities and plan the project timeline.

- Project Introduction: Introduce the project to students, explaining the objectives, phases, and expected outcomes.

Development (by students)
- Empirical Research: Students research on the causes and effects of climate change.
- Data Collection: Students gather data that represents or simulates the effects of climate change.
- Team Collaboration: Students form teams to divide tasks and collaborate on research and data collection.

Configuration & Results (by Students), Guidance & Evaluation (by Teachers)
- Artistic Projects: Students create a piece of art aiming to raise awareness about the problem.
- Presentations: Teams prepare presentations to share their research and projects.
- Feedback Sessions: Teachers provide feedback and support throughout the project.
- Evaluation: Teachers assess the projects based on research quality, creativity, and presentation skills

Review (by teachers):
- Assessment Review: Evaluate student performance and project effectiveness.
- Teacher Debriefing: Discuss successes and areas for improvement.
- Documentation: Compile documentation of the project process and results for future reference.

Project completion (by students):
- Final Preparations: Students complete any remaining work on their projects.
- Public Exhibition: Organize a public event where students present their projects to the community.
- Reflection: Students reflect on their learning experiences and project outcomes.
- Certificates and Awards: Acknowledge students' efforts and achievements with certificates or awards.

under development the final elements of the framework

3. Objectives and Methodologies

Learning Goals and Objectives	Main learning goal: Collaboratively create an artwork that represents one or more meteorological climate change effects to raise awareness about climate change

Knowledge:
- Understand the causes and effects of climate change on the Earth.
- Understand a wide range of meteorological alterations related to climate change.

Skills:
- Develop research and data collection skills
- Critical thinking analysis
- Presentation and communication skills
- Artistic creation and expression

Attitudes:
- Curiosity and engagement with the environment and sustainability
- Respect for diverse perspectives and teamwork
- Confidence in creative expression

Learning Outcomes and expected Results	- Explore artistic solutions to raise awareness about climate change - Apply knowledge about climate change effects to the creation of an artistic product - Create an artwork that represents one or more climate change effects
Prior Knowledge and Prerequisites	- Basic research skills - Familiarity with using computers and internet - Basic understanding of environmental sciences, especially related to weather / meteorology
Motivation, Methodology, Strategies, Scaffolds	Teaching methodology involves a combination of collaborative learning, IBL, creative and artistic expression and reflective learning: **Collaborative learning** - Group work: students are organized in small groups, each responsible for different aspects of the project. They periodically review each other's work, providing constructive feedback. - It is recommended to assign specific roles within groups: i.e. researcher, planner, note-taker… - It is also recommended to plan regular team meetings to discuss progress and next steps and use collaborative tools like Google Drive or Trello to share documents and track project progress. **Inquiry Based Learning: Project Based learning** - The project starts with a compelling question that guides the project and motivates students to explore and find solutions. It is important to ensure that the project has real-world applications to make learning more meaningful. - Encourage students to ask questions and try to find answers. Collect data from the internet but also from other students, teachers, and researchers. - Keep detailed records of research findings (notes, recordings, photos) **Creative and Artistic Expression** - Design a piece of art with a purpose - Blend science with art to make a science-based artwork - Plan a public exhibition to enhance motivation. **Reflective learning:** - Encourage students to reflect on their own learning and progress using portfolio or reflection journals. - Give regular feedback and facilitate students to give and receive feedback from their peers.

4. Preparation and Means

Preparation, Space Setting, *Troubleshooting Tips*	- Spaces: classroom, computer lab, arts classroom. - Classroom: introductory sessions; discussions and project planning - Computer lab: research, data visualization; creation of prototype, programming the sensors and the lights - Arts classroom: Artwork production and showcase
Resources, Tools, Material, Attachments, Equipment	- Computers with internet access - Research material: books, articles, online databases - Climate change simulation software and tools

	• Artistic materials and supplies (paints, paper, recycled materials...)
Health and Safety	• Ensure adequate supervision during electronic material manipulation
	• Promote safe practices in the use of equipment and artistic materials

5. Implementation

Instructional Activities, Procedures, Reflections	1. Introduction and team formation a. Introduce the idea of the artwork as a creative way to raise awareness about climate change. b. Split students into groups. c. Assign roles and provide an initial list of causes and effects of climate change in the environment. 2. Research and planning a. Conduct background research on an assigned environmental phenomenon: drought, storms, hurricanes… b. Plan the design of the artwork with 3D software. 3. Design of the artwork a. Students build the artwork b. Document the process 4. Testing the artwork a. finalize artworks and prepare presentations explaining the meaning of the design, choice of colors, etc. b. Conduct peer reviews and make final revisions c. Reflect on the overall project experience impact
Assessment - Evaluation	**Formative assessment:** • Observation: continuous observation and feedback during the process. • Peer review: implement "peer review moments" where teams present their work-in-progress and receive feedback from peers. • Reflection journal where students document their learning experience. It can include: ○ Reflect on the significance of raising awareness about climate change ○ Reflect on initial research findings ○ Reflect on the process of expressing an idea through art **Summative assessment:** • Assess the quality of the artwork presented through rubrics. ○ Content accuracy (40); ○ Creativity and design of the artwork (30); ○ technical quality (20); ○ overall impact (10). • Assess the learning process: ○ Engagement in the tasks (40); ○ Participation / proactivity (20); ○ Collaboration (30); ○ Resilience (10).
Presentation - Reporting - Sharing	• Artworks: they will represent the causes and/or effects of climate change in the environment. • Individual portfolio with learning reflection
Extensions - Other Information	**Propose New artistic pieces focussing on what can be done to mitigate or reduce climate change** • Research and Selection: Students research what can be done to mitigate or reduce climate change.

- Proposal Development: Students create proposals for new artistic products, including detailed justifications for why it is important to take action in this direction.
- Presentation and Advocacy: Teams present their artistic proposals to classmates and teachers, advocating for their chosen action to be represented in an artistic product.
- Community Engagement: Arrange a meeting with an art gallery, or find an art contest or call for artistic submissions.
- Reflection: After presentations and discussions, students reflect on the process and outcomes of their ideas.

Learning Outcomes:

- Research Skills: Develop research skills by investigating reliable sources about climate change causes and effects.
- Critical Thinking: Evaluate existing ways to raise awareness about climate change through art and make contributions.
- Advocacy and Communication: Practice persuasive communication skills through presenting proposals and engaging in discussions with classmates and community stakeholders.
- Community Engagement: Encourage action about climate change mitigation.

STEAME ACADEMY Prototype/Guide for Learning & Creativity Approach
Action Plan Formulation

Major steps in the STEAME learning approach:

STAGE I: Preparation by one or more teachers

1. Formulating initial thoughts on the thematic sectors/areas to be covered
   a. Recognizing causes and effects of climate change in the environment that are worth researching for students.
   b. Integrate STEAM areas: technology (digital tools), arts (artwork) and environmental sciences (climate change).
2. Engaging the wider environment / work / business / parents / society / ethics
   a. Involve local or regional institutions that fight climate change.
   b. Connect with local organizations that promote art as a way of political expression
   c. Engage parents and community members through presentations and exhibitions
3. Target Age Group of Students - Associating with the Official Curriculum - Setting Goals and Objectives
   a. Middle school students: 11-12
   b. Curriculum alignment: natural sciences, digital competence, technology, arts.
   c. Goals and objectives: develop research skills, promote environmental awareness, foster creativity.
4. Organization of the tasks of the parties involved - Designation of Coordinator - Workplaces etc.
   a. Designate a project coordinator (teacher) to oversee the project.
   b. Assign roles to participating teachers (natural sciences, technology, arts).
   c. Identify workspaces: classroom, computer lab, art room.

STAGE II: Action Plan Formulation (Steps 1-18)

Preparation (by teachers)

1. Relation to the Real World – Reflection
   a. Discuss the significance of climate change in society.
   b. Reflect on the importance of recognizing artistic contributions in exercising active citizenship.
   c. Become aware of the lack of girls choosing engineering careers.
2. Incentive – Motivation
   a. Create interest by showcasing prominent artworks that have made significant contributions to society.
   b. Highlight the impact of students' work on community awareness and environmental care.
3. Formulation of a problem (possibly in stages or phases) resulting from the above
   a. Define the central problem: How can we raise awareness about climate change through an artwork?
   b. Stages: research, design, presentation, and reflection.

Development (by students) – Guidance & Evaluation (in 9-11, by teachers)

4. Background Creation - Search / Gather Information

a. Students research causes and effects of climate change in the environment using online databases, local archives, libraries…
5. Simplify the issue - Configure the problem with a limited number of requirements
    a. Narrow focus to a manageable number of climate change causes and effects for creating the artwork.
6. Case Making - Designing - identifying materials for building / development / creation
    a. Plan design of the artwork: get familiar with the materials, the idea of an artwork…
    b. Sketch the artwork with a 3D modeling software
7. Construction - Workflow - Implementation of projects
    a. Execute the plan, create the artwork.
8. Observation-Experimentation - Initial Conclusions
    a. Try the artwork as a group.
9. Documentation - Searching Thematic Areas related to the subject under study – Explanation based on Existing Theories and / or Empirical Results
    a. Document process and findings
10. Gathering of results / information based on points 7, 8, 9
    a. Make improvements in the artwork.
11. First group presentation by students
    a. Students present their preliminary artwork and project progress to peers and teachers.

Configuration & Results (by students) – Guidance & Evaluation (by teachers)

12. Configure STEAME models to describe / represent / illustrate the results
    a. Develop visualizations to communicate the results of the design process
13. Studying the results in 9 and drawing conclusions, using 12
    a. Analyze the effectiveness of the models and visualizations
14. Applications in Everyday Life - Suggestions for Developing 9 (Entrepreneurship - SIL Days)
    a. Show or send a flyer about the artwork to relevant organisations (artistic and/or environment-related).

Review (by teachers)

15. Review the problem and review it under more demanding conditions
    a. Evaluate the initial problem and results, introducing new challenges or deeper investigation areas.

Project Completion (by students) – Guidance & Evaluation (by teachers)

16. Repeat steps 5 through 11 with additional or new requirements as formulated in 15
    a. Expand the project based on feedback and new requirements: more sophisticated electronic components or programming
17. Investigation - Case Studies - Expansion - New Theories - Testing New Conclusions
    a. Conduct further research
18. Presentation of Conclusions - Communication Tactics.
    a. Finalize all projects and present conclusions to a wider audience, including community members, local officials…
    b. Utilize various communication tactics

STAGE III: STEAME ACADEMY Actions and Cooperation in Creative Projects for school students

Title of Project: _____

Brief Description/Outline of Organizational Arrangements / Responsibilities for Action

STAGE	Activities/Steps Teacher 1(T1) Cooperation with T2 and student guidance	Activities /Steps By Students Age Group: _____	Activities /Steps Teacher 2 (T2) Cooperation with T1 and student guidance
A	Preparation of steps 1,2,3		Cooperation in step 3
B	Guidance in step 9	4,5,6,7,8,9,10	Support guidance in step 9
C	Creative Evaluation	11	Creative Evaluation
D	Guidance	12	Guidance
E	Guidance	13 (9+12)	Guidance
F	Organization (SIL) STEAME in Life	14 Meeting with Business representatives	Organization (SIL) STEAME in Life
G	Preparation of step 15		Cooperation in step 15
H	Guidance	16 (repetition 5-11)	Support Guidance
I	Guidance	17	Support Guidance
K	Creative Evaluation	18	Creative Evaluation