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| Activity plan | | | | |
| ACTIVITY PLAN | | | | |
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| **Theme** | **Subtopic** | **Activity Title** |
| 3. Creative and critical thinking in Eco STEAM education | 3.3. Environmental art and expression | Eco-friendly math formulas and models |

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| Introduction part (or activity overview) |
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| **Introduction part (or activity overview)** | The focus of the activity is on very important mathematical property: symmetry in mathematics in any aspect, formulas, 2D or 3D models. The main objective is to inspire students to reuse materials or to use eco-friendly building materials into inventive and productive works and models.  The idea is not only to provoke the students to be more original in exploring symmetry and creating a model that will have impact on others, but also to leave something behind that the next generations could develop furthermore.  By following this activity plan, you can qualify your students to search about eco-friendly materials, how to reuse the ones they have at the moment and to make advantageous change on the environment. |
| **SETTING** | Classroom equipped with digital equipment (computers, laptops, tablets or smart phones). |

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| Materials Needed |
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| **Materials Needed** | - Various recyclable or reusable materials or eco-friendly materials.  - Supplies like scissors, glue, tape, paint, markers, etc.  - Tools for upcycling (e.g., utility knives, hole punchers, hot glue guns, etc.)  - Workspaces (inside or outside). |

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| **Learning Outcomes** | * Develop deep understanding about the need to recycle certain materials. * Improve knowledge about the possible use of various recycling materials. * Enhance skills in digital research and data analysis. * Improve creativity and develop awareness about the many possibilities for recycling. |  |
| **Activity Contents** | **Activity: Eco-friendly math formulas and models**  **Theoretical part:** (Duration: 15 minutes) - Teachers provide examples of some of the mentioned formulas in the students’ educational process like or more complex binomial formula, palindromic numbers or palindromic sequence in biology, congruence properties, symmetrical functions, symmetrical surfaces, axes and points of symmetry in geometry etc.  **Activity Steps** (Duration: 1-3 hours per session, depending on the difficulty and entanglement of projects, and students can finish it in several classes).  **Task 1. Introduction to symmetry in formulas or models, selection of materials, design planning (60 minutes):**   * Students explore possibilities for the eco-friendly materials on the following link:   <https://www.barbuliannodesign.com/post/eco-friendly-building-materials-list>   * Discuss the concept of reusing and its importance in reducing waste and contribute to sustainability, explore examples of projects or models that impart symmetry.   Videos: <https://www.youtube.com/watch?v=Uzpkj68wfng> (Duration: 10:15)  <https://www.youtube.com/watch?v=25BDnWILV9I> (Duration: 13:37)  <https://www.youtube.com/watch?v=Yhpe_R7eHTI> (Duration: 6:16)  - Students select materials based on their interests and idea for their models.  - Studentsentertain the idea of symmetrical math formulas/geometric figures in a plane/space.  **Task 2. Creation, cooperation, implementation and presentation (60-90 minutes):**  - Students create the design for the model, start implementing different techniques and combinations of materials to achieve the desired results, become more aware of the use of recycled materials to make these models.  - Students work together and exchange ideas with their peers, supplying information for and support to one another. They discuss and share their progress, challenges, and successes.  - Students accomplish the products, compose their projects as models for presentation.  - Students present their projects to the class, describe the process, materials used during the task  and the idea for the originality and the artistry.  - Students review how their projects are valuable for the environment applying the materials ingenious. Students debate the advantages of creating this math models for symmetry, the challenges encountered, and the concepts and formulas revised during this activity. |  |
| **Assessments** | * Assessment of Web Quest reports for depth of research and understanding. * Personal presentations synthesizing the benefits of reusing and recycling, the challenges encountered, and the concepts learned through this creative process. * Reflection on how their models contribute to environmental sustainability and inspire others to learn about ecological awareness. |  |
| **Key Competences** | * Cognitive competence * Creativity competence |  |
| **Connections with Eco STEAM** | **Eco** – Eco-friendly models from the students for the students.  **S**cience – connections with concepts from physics, geography, chemistry and biology.  **T**echnology - use of digital tools for research and use of different software to sketch the models.  **E**ngineering - creation of innovative symmetrical models and products with math formulas that will increase students interests in mathematics.  **A**rts – artistic approach for creating models and projects with symmetrical formulas.  **M**ath – measurement and use of different math concepts applied in daily life. |  |
| **References** | • Online resources for design examples with reusable materials. |  |
| **Notes** | • The activity should be adaptable to different local upcycling materials.  • Emphasize safety and ethical conduct during practical work.  • Encourage students to reflect on their role in the usage of recycling/reusing materials and the importance of sustainable practices. |  |

**Assessment Table for Web Quest Reports:**

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| Assessment Criteria | Points | Comments |
| Depth of Research | \_\_/5 |  |
| Understanding of the concept symmetry | \_\_/5 |  |
| Accuracy of Information | \_\_/5 |  |
| Quality of Presentation | \_\_/5 |  |
| Use of Visuals | \_\_/5 |  |

**Assessment Table for Group Presentations:**

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| Assessment Criteria | Points | Comments |
| Comprehensiveness of Findings | \_\_/5 |  |
| Clarity in Presentation of Data | \_\_/5 |  |
| Understanding of recycling/reusing processes | \_\_/5 |  |
| Ecological Interpretations and Insights | \_\_/5 |  |
| Teamwork and Collaboration | \_\_/5 |  |
| Use of Visual Aids in Presentation | \_\_/5 |  |