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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 | 3.2. Design thinking for an eco-friendly solution | Designing an Eco-Sustainable House |

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| Introduction part (or activity overview) |
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| **Introduction part (or activity overview)** | This session is designedto engage students in the creative process of designing eco-friendly and sustainable houses, considering environmental impact, energy efficiency, and aesthetic appeal. |
| **SETTING** | The activities will take place in a classroom equipped with a smart board and computers. |

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| Materials Needed |
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| **Materials Needed** | - Drawing paper or sketchbooks; pencils, erasers, rulers, and other drawing tools; colored pencils, markers, or crayons; reference materials or examples of sustainable architecture; information about eco-friendly building materials and techniques; poster boards or large paper for final presentations; presentation materials (optional) - images, diagrams or models |

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| **Learning Outcomes** | Тhe specific skills, knowledge, or attitudes that participants are expected to develop or acquire through the activities:   * Learning what eco-friendly building materials are, advantages and disadvantages of eco-friendly materials; * The contribution of usage of eco-friendly building materials for a cleaner environment; * Developing creativity and artistic skills; * Developing the ability to perceive and create and design your own 3D shapes; * Developing spatial reasoning skills; * Making a sketch of a model and turn it into a paper model; * Calculating how much such a real object would cost in everyday life; * Students will gain a sense of belonging and develop design skills that will be necessary in the future in every society in order to preserve the environment and live a better quality of life; * Developing critical thinking and the ability to make a decision. * Developing leadership skills, group work, self-assessment and self-evaluation, as well as communication and speaking skills. * Developing a conscience and sense of environmental protection from local to global level. |  |
| **Activity Contents** | **Activity1 (Designing an Eco-sustainable house)**  **Theoretical part: (40 minutes)**  The teacher makes an Introduction of eco-sustainable design.  Students explore the concept of Eco-sustainable design and its importance in mitigating environmental impact, also examples of eco-friendly houses or sustainable architecture.  Ecological and sustainable homes must adapt their design and construction based on the possibilities and advantages that the environment offers them. One of the main strategies for building an ecological home is directly related to weather conditions.  Students explore eco-friendly building materials, energy-efficient systems, and sustainable design principles. They sketch out rough floor plans and make notes about key design features and sustainability strategies.  Students watch short videos:  Video1: <https://www.youtube.com/watch?v=LB5gzj0bmq0>  Duration(8min 52 sec)  Overview: The video is about a house without water, power and sewer connection.  Video2: <https://www.youtube.com/watch?v=K5IGqQmc-90>  Duration(8min 02 sec)  Overview: This video is about ten examples of Eco-sustainable houses  **Task 1: (45-60 minutes)**  The teacher gives a task to students to develop an Eco-sustainable house design.  Students start developing their designs, focusing on architectural elements, layout, and aesthetic considerations. They incorporate eco-friendly features such as passive solar design, natural ventilation, energy-efficient appliances, green roofs, rainwater harvesting systems, etc.  Teacher should provide guidance and feedback as students work on refining their designs and making decisions about materials and technologies.  **Task 2: (80 minutes)**  The students are given instruction to prepare presentations.  Students prepare their final presentations, using visual aids such as sketches, diagrams, or models  to illustrate their design concepts and sustainability strategies.  Students explain their design concepts, sustainability features, and architectural elements.  Afterwards, they give their own reflection. Then, they host a discussion session where students  provide feedback and ask questions about each other's designs, the effectiveness of different  sustainability strategies and the overall impact of eco-friendly design – how they can contribute to  a more environmentally conscious future.  Students clean up their workspaces and organize their materials.  **Additional Tips:**  The teacher should emphasied the importance of balance between environmental sustainability, functionality, and aesthetic appeal in architectural design and considered incorporating interdisciplinary elements into the activity, such as discussions about environmental science, sustainable development, or urban planning.  The teacher should help students to showcase the final house designs in a gallery or exhibition to celebrate student’s creativity and promote awareness of eco-friendly architecture. |  |
| **Assessments** | The teacher evaluates the students' work and achievements through:  - Verbal feedback during class; conversation with/among students; monitoring of students during individual and group work; observation the individual contribution of each student when working in groups; evaluation of students' presentations; highlighting the most elegant and ideal solution or Eco-sustainable house.  Each student independently evaluates his contribution to the work.  The final score is evaluated with a grade. It is possible to involve all students in the class in the assessment. After the presentations, students conduct oral reflection. |  |
| **Key Competences** | * Cognitive competence * Cultural competence |  |
| **Connections with Eco STEAM** | **Eco**- Save energy by using renewable energy sources in every household  **S**cience: Fuels, renewable energy sources and their conversion into other types of energy.  **T**echnology: Students will learn how to apply renewable energy sources for the needs of a household  **E**ngineering: Students will learn to design their own model of an Eco-sustainable house.  **A**rt: Students will learn to make a sketch of a house and turn it into a paper model.  **M**ath: Students perform various mathematical calculations to find out the price of a possible real Eco-sustainable house. |  |
| **References** | -M. A. Rosen, “The Future of SustainableDevelopment: Welcome to the EuropeanJournal of Sustainable Development Research,”  -Eur. J. Sustain. Dev. Res., vol. 1, no. 1, pp. 1–2,2017  -E. Mulliner and V. Maliene, “EnvironmentalEngineering Criteria for Sustainable HousingAffordability,” 8th Int. Conf. Environ. Eng., pp.966–973, 2011.  -UN Habitat, Sustainable Housing forSustainable Cities, no. October. 2012  -K. Kankaala, M. Vehiläinen, P. Matilainen, and P. Välimäki, “Smart city actions to supportsustainable city development,” Techne, vol.SpecialSer, no. 01, pp. 108–114, 2018. |  |
| **Notes** | •The design activity should be adaptable to different local ecosystems and climatic conditions.  •Architectural trends in different countries are different.  •Encourage students to reflect on their role in sustainable building. |  |

**Assessment Table for Web Quest Reports:**

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| Assessment Criteria | Points | Comments |
| Depth of Research | \_\_/5 |  |
| Understanding of Eco-stainable materials role | \_\_/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 Ecological Interpretations and Insights | \_\_/5 |  |
| Teamwork and Collaboration | \_\_/5 |  |
| Use of Visual Aids in Presentation | \_\_/5 |  |