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| ACTIVITY PLAN | | | | |
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| **Theme** | **Subtopic** | **Activity Title** |
| STEAM Integration in Environmental Education | Science in Environmental Studies | Analyzing the Impact of Pollution on Ecosystems |

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| Introduction part (or activity overview) |
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| **Introduction part (or activity overview)** | This activity encourages students to explore the scientific aspects of pollution and its impacts on various ecosystems. Through detailed research and practical experiments, students will examine the sources, types, and consequences of pollution, and propose scientific methods to mitigate its effects. |
| **SETTING** | Location: Classroom equipped with computers, internet access, and appropriate lab equipment for conducting experiments.  Educational Context: Collaborative group work (2-3 students per group) |

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| Materials Needed |
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| **Materials Needed** | Computers with internet access  Laboratory equipment (e.g., microscopes, test tubes, pH meters)  Chemicals for testing water and soil quality  Projector and screen for video presentations  Access to outdoor areas for sample collection (if possible) |

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| **Learning Outcomes** | * Understand the scientific fundamentals of pollution and its ecological impacts. * Apply scientific methods to analyze pollution in local ecosystems. * Develop and propose evidence-based solutions to reduce pollution. |  |
| **Activity Contents** | **Theoretical Part (Duration: 60 minutes)**: Provide an in-depth look into the science of pollution, including its chemical, biological, and physical dimensions. Discuss various pollutants, their sources, and their effects on air, water, and soil ecosystems. Explore key concepts such as bioaccumulation, eutrophication, and acid rain.   * **Key Concepts Covered**:   + Types of pollutants (organic, inorganic, biological, radiological)   + Mechanisms of pollution dispersion in different environments   + Long-term versus short-term ecological impacts of pollution * **Video Resources**:   + "Science Behind Pollution" (<https://www.youtube.com/watch?v=exampleLink1>) – Explains the chemical and biological processes that underpin pollution dynamics.   + "Pollution and Ecosystems" (<https://www.youtube.com/watch?v=exampleLink2>) – Discusses how various pollutants impact ecosystems globally.   **Task 1: Ecosystem Pollution Analysis (Duration: 80 minutes)** **Step 1**: Students select an ecosystem type (e.g., freshwater, marine, terrestrial) and research the common pollutants affecting these environments. Utilize scientific databases and journals to gather current data and studies.  **Step 2**: Conduct a virtual or real-life case study to assess the pollution levels. This may involve:   * Collecting water or soil samples and analyzing them for specific contaminants. * Using simulation software to model pollution dispersion and its ecological impacts.   **Step 3**: Compile a scientific report that includes:   * A detailed description of the chosen ecosystem and prevalent pollutants. * Data from their analyses and interpretations of how these pollutants impact the ecosystem. * Visual aids like charts, graphs, and maps to illustrate findings.   **Step 4**: Present the findings to the class, focusing on scientific accuracy and clarity in communication.  **Task 2: Developing Pollution Mitigation Strategies (Duration: 70 minutes)** **Step 1**: Based on their research and findings from Task 1, students brainstorm potential solutions to mitigate the identified pollution issues.  **Step 2**: Design a detailed action plan that includes:   * Specific scientific methods and technologies to reduce or eliminate pollutants. * A feasibility analysis of proposed solutions, considering technical, economic, and social factors. * A campaign plan to raise awareness about pollution and promote community engagement in mitigation efforts.   **Step 3**: Each group pitches their mitigation strategy to the class, simulating a proposal to local environmental agencies or community stakeholders. |  |
| **Assessments** | Depth and scientific rigor of ecosystem analysis.  Innovative approaches and practicality of mitigation strategies.  Effectiveness of communication and engagement during presentations. |  |
| **Key Competences** | Scientific literacy in environmental science  Analytical and problem-solving skills  Communication and teamwork  Civic responsibility and environmental stewardship |  |
| **Connections with Eco STEAM** | Eco Science: Core focus on scientific inquiry and methodologies.  Technology: Use of lab technology and data analysis tools.  Engineering: Application of engineering solutions to pollution control.  Arts: Creative presentation and visualization of scientific data.  Math: Statistical analysis of pollution data and effectiveness of solutions. |  |
| **References** | www.journalofenvironmentalpollution.com |  |
| **Notes** | This activity may extend to an ongoing project, allowing students to monitor their proposed solutions and their impact over time. |  |

**Evaluation Table for Analyzing the Impact of Pollution on Ecosystems Activity**

| **Evaluation Criteria** | **Points Available** | **Comments** |
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| **1. Depth of Scientific Research** | 20 | Evaluate the thoroughness and depth of the scientific research conducted on pollution and its impacts. |
| **2. Accuracy of Scientific Data** | 20 | Assess the accuracy and relevance of the scientific data and interpretations presented in the reports. |
| **3. Innovation in Solution Design** | 15 | Rate the creativity and feasibility of the pollution mitigation strategies proposed by the students. |
| **4. Quality of Experimental Methods** | 15 | Evaluate the appropriateness and execution of experimental methods used to analyze pollution in ecosystems. |
| **5. Clarity and Organization of Presentation** | 10 | Assess how effectively the group presented their findings and proposals, including the use of visual aids. |
| **6. Engagement and Interaction** | 10 | Rate the group’s ability to engage and interact with the audience during their presentation, including handling questions effectively. |
| **7. Team Collaboration** | 10 | Evaluate the effectiveness of teamwork and collaboration within the group throughout the project duration. |

**Total Points:** 100