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| ACTIVITY PLAN | | | | |
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| **Theme** | **Subtopic** | **Activity Title** |
| Collaboration and Communication in EcoSTEAM Projects | Integration of Technical Skills and Environmental Awareness | Using Technology for Environmental Solutions |

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| Introduction part (or activity overview) |
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| **Introduction part (or activity overview)** | This activity involves students combining technical skills with environmental awareness to develop sustainable solutions to environmental challenges. The focus is on leveraging technical knowledge in science, technology, engineering, and mathematics (STEM) to create innovative solutions that promote environmental sustainability. |
| **SETTING** | Location: Classroom for planning and discussion, online resources for research, and lab or field environment for implementation.  Educational Context: Collaborative group work. |

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| Materials Needed |
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| **Materials Needed** | Research materials (books, articles, internet access)  Project planning tools (whiteboard, markers, project management software)  Prototyping materials (craft supplies, recycled materials, basic tools)  Presentation tools (e.g., PowerPoint, poster boards)  Communication tools (video conferencing software, messaging apps) |

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| **Learning Outcomes** | * Develop skills in integrating technical knowledge with environmental awareness. * Enhance understanding of the role of technical skills in addressing environmental issues. * Improve abilities in project planning, implementation, and presentation. |  |
| **Activity Contents** | **Theoretical Part (Duration: 60 minutes)**: Provide a detailed introduction to the importance of integrating technical skills with environmental awareness to develop sustainable solutions.   * **Introduction to Technical Skills and Environmental Awareness**:   + Combining technical skills with environmental awareness is essential for developing effective and sustainable solutions to environmental challenges. Technical skills in areas such as engineering, computer science, and data analysis can be applied to design and implement solutions that address issues like pollution, resource depletion, and climate change.   Consider the development of a smart irrigation system. Engineers, computer scientists, and environmental scientists must work together to design a system that uses sensors and data analytics to optimize water usage, reducing waste and promoting sustainable agriculture.   * + **Case Studies of Successful Integration Projects**:     - Smart irrigation systems use sensors, data analytics, and automated controls to optimize water usage in agriculture. These systems help reduce water waste, improve crop yields, and promote sustainable farming practices. For example, the use of soil moisture sensors and weather data to schedule irrigation can significantly reduce water consumption while maintaining healthy crops.     - Monitoring systems for renewable energy sources, such as solar panels and wind turbines, use sensors and data analytics to track performance and identify maintenance needs. These systems help ensure optimal energy production and reduce downtime, contributing to the efficiency and reliability of renewable energy projects.     - Technologies such as air quality sensors and water quality monitoring systems can detect and measure pollutants in the environment. These systems provide real-time data that can be used to identify pollution sources, assess the effectiveness of pollution control measures, and inform policy decisions.   + **Key Skills for Integrating Technical Skills and Environmental Awareness**:     - Proficiency in technical fields such as engineering, computer science, and data analysis is crucial for developing and implementing solutions. Students should be familiar with tools and techniques relevant to their projects, such as programming languages, sensor technology, and data visualization software.     - Understanding environmental principles and issues is essential for identifying relevant challenges and designing effective solutions. Students should be aware of topics such as ecosystems, resource management, and environmental impact assessment.     - Effective project management helps teams plan, execute, and monitor their projects. It involves setting clear objectives, defining roles and responsibilities, creating timelines, and using project management tools to track progress.     - Clear and open communication is vital for successful collaboration. It involves active listening, expressing ideas clearly, and providing constructive feedback. Teams should establish regular communication channels and meetings to ensure everyone is on the same page. * **Video Resources**:   + "Integrating Technology for Environmental Solutions" https://www.youtube.com/watch?v=\_fU9vvQmXfs   **Discussion Prompts**:   * How can technical skills be applied to solve environmental issues? * What are the key challenges in integrating technical skills with environmental awareness, and how can they be addressed? * How can effective communication and project management enhance collaboration in technical projects?   **Task 1: Project Ideation and Planning (Duration: 90 minutes)** **Steps**:   1. Divide students into teams, ensuring that each team includes members with technical skills (e.g., engineering, computer science, data analysis) and environmental science knowledge. 2. Conduct a brainstorming session to generate project ideas that leverage the technical skills and environmental awareness of the team members. Use mind maps or idea boards to visualize concepts. 3. Create a detailed project plan that outlines the objectives, methodology, timeline, and roles and responsibilities of each team member. Use project management tools to organize tasks and monitor progress.   **Task 2: Project Development and Implementation (Duration: 120 minutes)** **Steps**:   1. Use provided materials to research the environmental challenge and gather relevant data. Collaborate with team members to analyze the data and develop innovative solutions. 2. Use the technical skills and environmental knowledge from different disciplines to develop prototypes or solutions. This may involve coding, building hardware, designing visuals, or conducting experiments. 3. Test the prototypes or solutions in a controlled environment or field setting. Collect data on performance and make necessary refinements to improve effectiveness.   **Task 3: Presentation and Feedback (Duration: 60 minutes)** **Steps**:   1. Each team creates a presentation that showcases their project, including the problem addressed, interdisciplinary approach, development process, and results. Use visual aids such as slides, videos, or live demonstrations. 2. Present the projects to the class, highlighting the contributions of each discipline and the overall impact of the solution. 3. Engage in a Q&A session where peers and instructors provide feedback and ask questions. Discuss potential improvements based on the feedback received. |  |
| **Assessments** | Effectiveness of integrating technical skills and environmental awareness.  Quality and innovation of the developed solutions.  Clarity and persuasiveness of the presentation.  Ability to defend solutions during the Q&A session.  Team collaboration and participation. |  |
| **Key Competences** | Integration of technical skills and environmental knowledge  Research and problem-solving skills  Project planning and management  Effective communication and presentation skills  Critical thinking and innovation |  |
| **Connections with Eco STEAM** | Eco: Developing sustainable solutions through the integration of technical skills and environmental awareness.  Science: Applying scientific principles to environmental challenges.  Technology: Utilizing and developing technological tools and applications.  Engineering: Creating and refining prototypes to address real-world problems.  Arts: Creatively presenting solutions and demonstrating their impact.  Math: Analyzing data collected during testing and evaluating the effectiveness of solutions. |  |
| **References** | https://nap.nationalacademies.org/read/2129/chapter/13 |  |
| **Notes** | This activity can be extended into a longer-term project, where students further develop and implement their solutions in real-world settings.  Encourage students to engage with local environmental organizations or experts from different disciplines for real-world insights and support. |  |

**Evaluation Criteria Table for Using Technology for Environmental Solutions**

| **Evaluation Criteria** | **Points Available** | **Comments** |
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| **1. Effectiveness of Integrating Technical Skills and Environmental Awareness** | 20 | Assess how well the team integrated technical skills and environmental knowledge to develop the solution. |
| **2. Quality and Innovation of the Developed Solutions** | 20 | Evaluate the quality, functionality, and innovation demonstrated in the developed solutions. |
| **3. Clarity and Persuasiveness of the Presentation** | 20 | Rate the clarity, persuasiveness, and engagement level of the presentation given by each team. |
| **4. Ability to Defend Solutions During Q&A Session** | 20 | Assess the quality and relevance of responses during the Q&A session and the ability to defend the solutions. |
| **5. Team Collaboration and Participation** | 20 | Evaluate the level of teamwork, communication, and participation among team members throughout the activity. |

**Total Points:** 100