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| ACTIVITY PLAN | | | | |
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| **Theme** | **Subtopic** | **Activity Title** |
| Creative and Critical Thinking in EcoSTEAM Education | Evaluating and Analyzing Environmental Information | Critical Analysis of Environmental Data |

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| Introduction part (or activity overview) |
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| **Introduction part (or activity overview)** | This activity focuses on developing students' critical thinking and analytical skills by evaluating and interpreting environmental information. Students will gather data from various sources, analyze it critically, and present their findings and recommendations. |
| **SETTING** | Location: Classroom and computer lab for research and analysis.  Educational Context: Collaborative group work (4-5 students per group). |

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| Materials Needed |
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| **Materials Needed** | Computers with internet access and relevant software (e.g., spreadsheets, data visualization tools)  Access to online data sources for environmental statistics  Projector for presentations  Graph paper, calculators, and other analytical tools |

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| **Learning Outcomes** | * Develop skills in critical thinking and data analysis. * Learn to evaluate and interpret environmental information from multiple sources. * Enhance abilities in research, project development, and presentation. |  |
| **Activity Contents** | **Theoretical Part (Duration: 60 minutes)**: Begin with an introduction to the importance of evaluating and analyzing environmental information. Highlight various methods and tools used in critical analysis.   * **Introduction to Critical Thinking in Environmental Analysis**:   + Explain what critical thinking is and why it is essential in evaluating environmental information. Discuss how critical analysis helps in making informed decisions and solving complex environmental problems.   + Break down the key components of critical analysis, including identifying biases, evaluating sources, interpreting data, and making evidence-based conclusions. * **Methods for Evaluating Environmental Information**:   + Discuss how to evaluate the credibility and reliability of different sources of environmental information. Highlight the importance of peer-reviewed studies, government reports, and reputable organizations.   + Explain various methods for interpreting environmental data, including statistical analysis, trend analysis, and comparative analysis.   + Introduce the concept of critical questioning and how it can be used to probe deeper into environmental issues. Provide examples of critical questions that can guide the analysis process.   + Discuss the role of data visualization in making complex data more understandable. Introduce tools and techniques for creating effective visualizations. * **Case Studies**:   + **Case Study 1: Climate Change Data Analysis**: Present a case study on analyzing climate change data. Discuss the sources of data, methods used for analysis, and the conclusions drawn from the study.   + **Case Study 2: Air Quality Evaluation**: Share a case study on evaluating air quality information in an urban area. Highlight the data collection process, analysis methods, and the implications of the findings. * **Video Resources**:   + " Math and Critical Thinking in Environmental Ed " https://www.youtube.com/watch?v=Ey-E0Uz-\_Qs – A video showcasing the role of critical thinking in environmental science.   + " Data science for the environment " https://www.youtube.com/watch?v=ph439t-kTIE – An overview of methods and tools for analyzing environmental data.   **Discussion Prompts**:   * How can critical thinking help in identifying biases in environmental information? * What are the key factors to consider when evaluating the credibility of a data source? * How can data visualization enhance the interpretation and communication of environmental data?   **Task 1: Data Collection and Evaluation (Duration: 45 minutes)** **Objective**: To collect and critically evaluate environmental data from multiple sources.   * **Step 1**: Form groups and assign each group a specific environmental issue to study (e.g., climate change, air quality, water pollution). * **Step 2**: Use online data sources to collect information on the assigned issue. Ensure that data is gathered from multiple reputable sources. * **Step 3**: Critically evaluate the credibility and reliability of the sources. Identify any potential biases or limitations. * **Step 4**: Compile the data and prepare it for analysis.   **Task 2: Data Analysis and Interpretation (Duration: 90 minutes)** **Objective**: To analyze the collected data and interpret the findings critically.   * **Step 1**: Use statistical methods and data visualization tools to analyze the collected data. Look for trends, patterns, and anomalies. * **Step 2**: Interpret the data to draw meaningful conclusions. Consider the broader context and potential implications of the findings. * **Step 3**: Develop recommendations based on the analysis. Identify possible solutions or actions that can address the environmental issue. * **Step 4**: Prepare a presentation summarizing the data analysis, interpretation, and recommendations.   **Task 3: Presentation and Feedback (Duration: 45 minutes)** **Objective**: To present the analysis and recommendations to the class and receive feedback.   * **Step 1**: Each group presents their data analysis, interpretation, and recommendations to the class. * **Step 2**: Conduct a Q&A session where other students and the instructor can provide feedback and ask challenging questions. * **Step 3**: Groups reflect on the feedback received and discuss potential improvements. |  |
| **Assessments** | Accuracy and thoroughness in data collection and evaluation.  Critical thinking and analytical skills demonstrated in data interpretation.  Quality and feasibility of recommendations based on the analysis.  Clarity and persuasiveness of the presentation.  Team collaboration and dynamics. |  |
| **Key Competences** | Research and analytical skills  Critical thinking and evaluation  Strategic planning and project management  Effective communication and presentation skills  Teamwork and collaboration |  |
| **Connections with Eco STEAM** | Eco: Understanding and addressing environmental issues through critical analysis.  Science: Applying scientific principles to analyze and interpret environmental data.  Technology: Utilizing digital tools and software for data analysis and visualization.  Engineering: Developing solutions based on critical evaluation and analysis.  Arts: Creating engaging presentations and visualizations to communicate findings.  Math: Using statistical methods and data analysis to support critical evaluations. |  |
| **References** | https://www.tomorrow.bio/post/the-role-of-critical-thinking-in-environmental-sustainability-a-holistic-approach-2023-10-5370564201-rationality |  |
| **Notes** | This activity can be extended into a longer-term project, where students continuously evaluate and analyze new environmental data based on ongoing research and feedback. |  |

**Evaluation Criteria Table for Critical Analysis of Environmental Data Activity**

| **Evaluation Criteria** | **Points Available** | **Comments** |
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| **1. Accuracy and Thoroughness in Data Collection and Evaluation** | 20 | Assess the precision and comprehensiveness of the data collected and evaluated. |
| **2. Critical Thinking and Analytical Skills** | 20 | Evaluate the demonstration of critical thinking and analytical skills in interpreting the data. |
| **3. Quality and Feasibility of Recommendations** | 20 | Rate the reliability and practicality of the recommendations based on the analysis. |
| **4. Clarity and Persuasiveness of Presentation** | 20 | Rate the clarity, persuasiveness, and professionalism of the presentation. |
| **5. Team Collaboration and Dynamics** | 20 | Assess the level of teamwork, including communication, cooperation, and mutual support among team members. |

**Total Points:** 100