OER Assignment: Microbit Environmental Monitor

Assignment Overview

This project is designed for Grade 9 students to foster critical thinking, teamwork, and technological skills. Students will collaboratively design and build a sustainable environmental monitoring system using Micro:bits and Python. As an Open Educational Resource (OER) project, this task emphasizes real-time data collection (e.g., temperature, humidity, light levels), data analysis, and data visualization using tools like MakeCode or basic web interfaces. Students will take ownership of their learning by applying their creativity and problem-solving skills to address environmental issues in their school or local community.

Learning Objectives

- Apply Python programming skills to real-world data collection.
- Build a functioning environmental monitor using Micro:bits and sensors.
- Design a user-friendly data visualization interface (e.g., using MakeCode and web tools).
- Collaborate in teams to solve challenges and improve project design iteratively.
- Reflect on how technology can be used to address sustainability goals.

Materials Needed

- Micro:bit (with batteries or USB connection)
- - Sensor kit (e.g., temperature, light, humidity sensors)
- Access to MakeCode Microbit or Python editor
- Computers with internet access
- Basic HTML template or Google Sheets (for visualizing data)

Steps and Instructions

1. Brainstorm environmental issues that can be monitored (e.g., temperature in classrooms, light levels, etc.).

2. Sketch a system that uses Micro:bit and sensors to collect relevant data.

3. Program the Micro:bit in MakeCode or Python to collect data.

4. Set up a method for displaying or logging the data (e.g., web-based dashboard or spreadsheet).

5. Test your system and iterate on design.

6. Create a short report or video explaining how your project contributes to sustainability.

Brainstorming Table

Environmental Issue	Sensor Needed	Why is it Important to Monitor?

ISTE Standards Addressed

1.4.c – Global Collaborator: Students develop solutions in teams to address real-world issues.

1.5.d – Computational Thinker: Students apply data collection and analysis in a meaningful context.

1.6.b – Creative Communicator: Students choose platforms to communicate their solution effectively.

Assessment Rubric

Criteria	**Beginning (1)**	**Developing (2)**	**Proficient (3)**
Functionality of Micro:bit System	System does not collect or display data.	System collects some data but display is inconsistent.	System collects and displays data accurately and clearly.
Programming and Coding	Code is incomplete or has major errors.	Code runs with minor issues or lacks clarity.	Code is well-structured, clear, and functional.
Collaboration and Problem Solving	Minimal teamwork or contribution.	Some collaboration evident, but not consistent.	Excellent teamwork, all members contribute meaningfully.

Presentation and Communication	Presentation lacks clarity or detail.	Presentation communicates most ideas but misses key points.	Presentation is clear, engaging, and effectively explains the project.
Connection to Sustainability	No clear link to sustainability.	Some mention of sustainability but lacks depth.	Strong connection to sustainability goals explained clearly.