LESSON PLAN

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AlGAE BIO-REACTORS

ZONE: Innovation Zone AGE GROUP: 19-24 EQUIPMENT: Air pump, tubes, T connectors, MQ3 sensor, jumpers, water bottles, modified cups, Arduino, computer, RGB LEDs, pipettes, 12V charger, adapter

MATERIALS: Water, Algae culture, NPK, salt

DESCRIPTION: In this hands-on session, participants will dive into the fascinating realm of sustainable technology, crafting their own Algae Reactor using Arduino MQ3 sensor, RGB sensor, 2 bottles, tubes, T-connector, and an air pump. By the end of the workshop, participants will not only have their functioning Algae Reactor but also a deeper understanding of DIY tech, sustainable practices, and the potential impact of algae cultivation on our environment. Join for an engaging and educational experience!

ENGINEERING DESIGN CHALLENGE:

Algae are remarkable organisms known for their significant contributions to oxygen production and protein formation. Learning how to grow them and harnessing their strengths could have a profound impact on the world around us.

LEARNING OBJECTIVES:

- Participants will learn the fundamental principles of integrating Arduino technology with sensors, for environmental monitoring in the context of algae cultivation.
- Acquire hands-on knowledge of the principles governing algae cultivation and understand its potential environmental benefits. Participants will gain practical insights into optimizing conditions for successful algae growth.
- Environmental Monitoring Expertise: Learn to utilize sensors for monitoring and controlling the Algae Reactor's environment, ensuring optimal conditions for algae growth and gaining a broader understanding of sustainable practices.

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LESSON PLAN (Pg 2)

Time / Duration	Activity	Materials/requirements
15 min	1- Introduce yourself. 2- Introduce students to each other (Ice breaking). / Start introducing the workshop through a series of questions. 3- Explain what we are going to do today.	Computer, internet access, screen
20 h	**Presentation :** 1- In depth presentation about algaes and their applications.	Computer, internet access, screen
1h	**Step-by-Step (participants can work in pairs depending on the number:** - Add the algae culture and nutrients in the bottles - Close the bottles with the cups, add the tubes and T connector, and connect the air pump - Let's connect the MQ3 to the Arduino (place the sensor in the box) - Let's write the code following the instructions on the screen - The instructor will check each code and support in finding mistakes - Let's run the code, is the MQ3 connecting properly? - Let's connect the RGB to the Arduino - Let's write the code following the instructions on the screen (or copy the code provided depending on the level of the class) - The instructor will check each code and support in finding mistakes - Let's run the code, is the RGB connecting properly? - Let check the concise to analyze any variation in air quality, the sensor will take at least 5 minutes to warm up.	EQUIPMENT: Air pump, tubes, T connectors, MQ3 sensor, jumpers, water bottles, modified cups, Arduino, computer, RGB LEDs, pipettes, 12V charger, adapter MATERIALS: Water, Algae culture, NPK, salt
15 min	Final assessment, consideration of possible different application for this type of material. How to take care of the Algaes at home	

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