Project Guidelines and rubric: Wastewater Treatment Design Challenge

# Objective:

In this challenge, your team will design an improved wastewater treatment system that addresses specific challenges or targets specific contaminants. You will integrate your knowledge of chemical processes, sustainable practices, and analytical techniques to propose an innovative solution for effective and environmentally friendly wastewater treatment.

# Task:

1. Identify a specific challenge or contaminant to target for your wastewater treatment design. This could be based on real-world scenarios or hypothetical situations.
2. Research and select appropriate chemical processes, sustainable practices, and analytical techniques that align with your treatment system's objectives.
3. Conduct water quality testing using the provided testing kits to assess the characteristics of the wastewater you will be treating.
4. Design a comprehensive wastewater treatment system that effectively addresses the identified challenge or contaminant while considering sustainability and environmental impact.
5. Create a presentation showcasing your wastewater treatment system design, including its effectiveness, sustainability, and potential real-world applications.

## Rubric:

## Criteria 1: Effectiveness (30 points)

(10 points) The design effectively addresses the identified challenge or targets the specific contaminant.

(10 points) The proposed chemical processes and treatment techniques are appropriate for achieving pollutant removal or water quality improvement.

(10 points) The design demonstrates a clear understanding of how each treatment stage contributes to overall effectiveness.

## Criteria 2: Sustainability (25 points)

(10 points) The design incorporates sustainable practices and environmentally friendly approaches to wastewater treatment.

(10 points) The team considers the potential environmental impacts and resource conservation in their design decisions.

(5 points) The proposed treatment system aligns with principles of sustainable wastewater management.

## Criteria 3: Scientific Reasoning (20 points)

(10 points) The team provides a well-reasoned scientific rationale for their chosen treatment processes and techniques.

(10 points) The design demonstrates a comprehensive understanding of the chemical reactions and processes involved in wastewater treatment.

## Criteria 4: Team Collaboration (15 points)

(5 points) The team works cohesively and effectively collaborates in all aspects of the project.

(5 points) Each team member contributes significantly to the design process and presentation.

(5 points) The team demonstrates effective communication and division of tasks.

## Criteria 5: Presentation (10 points)

(5 points) The presentation is clear, organized, and effectively conveys the wastewater treatment system design.

(5 points) Visual aids and data are used effectively to support the presentation.

Total: 100 points