

Stewards Ma Kam Ming Charitable Foundation (SMKMCF) Ma Ko Pan Memorial College - Smart Aquarium

School	Stewards Ma Kam Ming Charitable Foundation (SMKMCF) Ma Ko Pan Memorial College
Teachers	Mr. Fong Kin Lung, Ms. Yau Shuk Han, Ms. Lau Choi Tung, Mr. Wong Tin Yan
Subjects	Information and Communication Technology, Integrated Science
Year level	Form One
Learning objectives	Make use of micro:bit for programme designing Learn to create 3D models by TinkerCAD Integrate micro:bit and TinkerCAD to invent a prototype
e-Learning tools or equipment used	Software : TinkerCAD Device : Micro:bit

Introduction of Lesson Design

The project aims to integrate two subjects, Integrated Science and Information and Communication Technology, to inspire students in designing a smart device to improve current situations with their knowledge. Students are equipped with basic science knowledge such as the vital functions of living things, classification of living things and the importance of biodiversity in a habitat, which allows students to have more understanding on the aquarium and the organisms that inhabit the aquarium. Computer knowledge about micro:bit and TinkerCAD are taught before introducing the project, this ensure students are familiar in programme designing and creating 3D models. Students are then form into groups of four to work on the project. They may work on different aspects for the smart aquarium, i.e. auto fish-feeding machine, basic light sensor, advanced light sensor, depends on their interests.



Six cycles in total would be given to students to complete the project. Within the six cycles, students would practice the engineering design process in solving the smart aquarium in the following steps:

1. Ask to identify the constraints of the aquarium and define the problem
2. Imagine possible solution
3. Plan by selecting a promising design
4. Create a prototype
5. Test and evaluate the prototype
6. Improve and redesign as needed

Mind maps are provided in the first step to guide students to think about the factors affecting marine life in aquarium, problems may encounter in aquarium and possible devices used in aquariums. A comprehensive understanding towards the project could be achieved, thus, inspire them to invent a prototype as a solution of the problem identified. Block diagrams are provided in the second step for students to identify the most important components of the system, so as to visualize the inputs and outputs of the system.

After six cycles, each group of students are invited to present and introduce their designs which should be workable and able to solve the problem by integrating with micro:bit and the designed device.

