# Life under water – Ocean Health Monitor

The big picture – why is this relevant?

Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing states and least-developed countries.

Learning objectives:

* Understand what the Global Goals are
* Understand what [goal 14](https://www.globalgoals.org/14-life-below-water) is and its significance
* Understand the basics of transmitting data
* Produce a data node product to meet the success criteria
* Develop the product further with additional features

Engagement – How can I engage learners?

* Learners may be engaged and motivated by the Global Goals context
* Learners will enjoy testing their products as it has a physical aspect and is a good example of real world IoT device that helps scientists
* The engineering elements may motivate some learners

Assessment for learning

**Expected progress:**

* Learners follow the guide and create a product that meets the first success criteria

**Good progress:**

* Learners create a product that meets more than one of the success criteria and improve the product from initial designs

**Exceptional progress:**

* Learners create a complete product that meets all success criteria. Learners iteratively improve the product and add additional functionality

Key concepts:

* Global Goals (target 14 A)
* Increasing scientific knowledge using technology
* Node and Gateway
* Sensors
* Transmitting sensor data over radio

Key words:

* Sensors - <https://en.wikipedia.org/wiki/Sensor>
* Node - <https://en.wikipedia.org/wiki/Node_(networking)>
* Gateway - <https://en.wikipedia.org/wiki/Default_gateway>
* Big data - <https://en.wikipedia.org/wiki/Big_data>

Differentiation:

This mini project is largely differentiated by outcome as the initial IPO (input-process-output) design is provided and learners can simply create a program that meets the design. Stronger learners can start designing creating solutions for the other success criteria and teachers can support as necessary.

Resources:

* micro:bit(s) x2
* battery peripheral
* materials to make the floating base
* additional sensor peripherals (optional)

Lesson flow

* Introduction to the Global Goals concept
* Introduction to the ‘life below water’ goal
* Discus why this goal is important and what may happen if we ignore it
* Introduce the success criteria and discuss initial ideas on how to solve the problem
* Explain how this is a simplified version of how it would work in real life (IRL) using the diagram (optional)
* Introduce what will be sensed by the micro:bit for this product
* Discuss the sensors on the micro:bit and how other sensors can be used (if available)
* Introduce the IPO (input-process-output) model and go through the IPO and relate to the success criteria
* Put learners into small groups (2+) and explain that they will work as a team to design and build a product that meets the success criteria. Remind learners about the importance of communication and collaboration and how the designs should be reflected in the product
* Provide the learners with the activity sheet, micro:bits and making resources, learners will need to extend the algorithm as only the first two steps are demonstrated
* Get the learners to start to design and create the product in their groups
* Encourage learners to use the IPO worksheet to plan their additional features

This lesson could easily be extended over 2 or more lessons to allow learners to fully explore their product and develop it beyond the brief

Making

**BEWARE do not test the products in water, micro:bits are not waterproof!**

* This activity includes making the product and also a case to contain the micro:bit, battery and any other peripherals used. The node and gateway will need different types of cases as both have different requirements

The product will need to be tested, so a mock-up of a floating base will need to be made but do not test it in water as this could be dangerous and could damage the equipment