# Life on Land – tree protector

The big picture – why is this relevant?

A flourishing life on land is the foundation for our life on this planet. We are all part of the planet’s ecosystem and we have caused severe damage to it through deforestation, loss of natural habitats and land degradation. Promoting a sustainable use of our ecosystems and preserving biodiversity is not a cause. It is the key to our own survival.

Learning objectives:

* Understand what the Global Goals are
* Understand what [goal 15](https://www.globalgoals.org/15-life-on-land) is and its significance
* Understand the basics of IoT
* Produce an IoT ‘tree protector’ 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 of the falling trees

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 15.2) End deforestation and restore degraded forests
* Deforestation
* Illegal logging
* IoT
* Node and gateway

Key words:

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

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 and creating solutions for the other success criteria and teachers can support as necessary.

Resources:

* micro:bit(s) x 2
* battery peripheral
* materials to make a tree to test the product

Lesson flow

* Introduction to the Global Goals concept
* Introduction to the ‘life on land’ 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
* Introduce what will be sensed by the micro:bit for this product
* Introduce the IPO (input-process-output) model and go through the IPO for the first success criteria
* 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
* 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
* 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 be extended over 2 or more lessons to allow learners to fully explore their product and develop it beyond the brief.

Making

* This activity includes making the product and 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 falling tree will need to be made/sourced