# Light-up fishing nets

**Main theme: sustainable fishing** [(Global Goal 14.4)](https://www.globalgoals.org/14-life-below-water)

**Additional themes: protection of marine ecosystems, support small scale fisheries.**

## Overview

In this activity students learn about the problem of **bycatch** (unwanted fish and other marine creatures trapped by commercial fishing nets during fishing for a different species), the impact of it and potential solutions, before creating a prototype light-up fishing net using a micro:bit.

Learning objectives:

* To learn about the problem of ‘bycatch’ and its impact on marine ecosystems
* To identify possible solutions to the problem
* To learn how inputs (sensors) and outputs (lights and sound) of the micro:bit can be used to design and make prototype solutions

**Activities:**

**What is bycatch?**

* Write the word ‘bycatch’ on the board and ask students to consider what it could mean.
* Give students time to research the problem of bycatch and share their learning with the class (**slide 2**). Students could be grouped to consider and then share:
  + What is bycatch?
  + Why does bycatch happen?
  + What are the impacts of bycatch?

**What solutions already exist to reduce bycatch?**

* Discuss what students may have already discovered about solutions to the problem of bycatch, or give them time to research these (**slide 3**) e.g.
  + Simple modifications to fishing gear, so birds, fish, turtles, dolphins etc. are not caught or can escape
  + Using specially designed types of hooks and nets
  + Using technology to allow fishermen to see inside their nets and use sound devices to deter species they do not intend to catch

**Light-up fishing nets**

* Discuss with students what they have found out about LED nets (**slide 4**). Fitting LEDs on nets can help to reduce bycatch in a cheap and simple way - the lights act as a visual warning for turtles and birds, but don’t affect the amount of fish caught in the nets.
* Introduce the idea of using a micro:bit to build a prototype of an LED net that also could emit a high frequency pulsed sound.
* Explore how the fishing nets could work. The example prototype on **slides 5 & 6** (and supplied **light-up nets hex** file) turns on micro:bit’s LEDs when the light level is below a certain point (assuming a certain sea depth) and emits a high frequency pulsed sound.
* Depending on your students you could:
  + Use [**the example**](https://makecode.microbit.org/_VE30tCesCgh9) **light-up nets program** to introduce the theory and application of selection (IF statements), sensors (light sensors) and outputs (LED display).
  + Explore what the problems/issues with the example prototype are (the best LEDs for reducing bycatch are green, making it waterproof etc.)
  + Give students some fish netting and other materials to work out how to attach the light to the net – **see safety note below.**
  + Use the algorithm and program as a starting point and ask students to improve the prototype.
  + Encourage students to create their own prototype algorithm and program, without referencing the example.
  + Let students create their own prototype for addressing bycatch.

**Safety**

Do not use BBC micro:bits in water or with wet hands. Prototyping should be done without water present.

**Review**

* + Discuss with students what they have learnt from their exploration of bycatch and the prototype they have created (**slide 7**).
  + Allow students time and space to consider other ways they could help prevent bycatch, through the design challenge.

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