# A sea turtle safe beach light

**Main theme: protection of marine biodiversity**[(Global goal 14)](https://www.globalgoals.org/14-life-below-water)

**Additional themes: marine ecosystems, animal extinction, illegal wildlife trade**

## Overview

In this activity students discover all about sea turtles before creating a prototype sea turtle safe beach light using micro:bit’s LEDs.

**Learning objectives:**

* To discover more about the threats faced by sea turtles
* To learn about efforts to help them
* To learn how micro:bit inputs (sensors) and outputs (LED lights) can be used to make a prototype to help protect sea turtles

**Activities:**

**Discovering sea turtles**

* Find and play a suitable short video clip to introduce sea turtles.
* Ask students to share what they currently know about sea turtles (if anything).
* Give students time in pairs or small groups to find more about sea turtles and share their research (**slide 2**).
* Students could prepare a short presentation, poster or video to share what they have discovered about sea turtles.

**Sea turtles in trouble**

* Highlight that sea turtles are in trouble and their numbers are falling. Ask students to share why they think this is. They may have come across this in their research, or if not, give them time find out the main issues for sea turtles and the reasons behind them (**slide 3**), e.g.
  + Illegal trade for sea turtles (meat, eggs, shells etc)
  + Fishing (bycatch is a particular issue)
  + Habitat loss (human activity on beaches for nesting, coral reef damage)
  + Climate change (e.g. increased temperature & impact on sex of hatchlings)
  + Plastics (sea turtles eat jellyfish which floating plastics can look similar to)
  + Tourism (irresponsible tourism)

**How can we help sea turtles?**

* Give students time to research and/or share what is being done to help sea turtles (**slide 4**), e.g.
  + Campaigns to stop illegal trade
  + Educating locals and tourists
  + Protecting habitats (especially beaches, e.g. beach rangers and ‘beach safe’ lighting)

**Helping hatchlings**

* Invite students to share what they have already found out about sea turtle hatchlings, why they need special protection and what is already being done to help (**slide 5**).
* Introduce the idea of using micro:bit to help sea turtles hatchlings in some way and encourage students to brainstorm some possible ideas.
* If you have time, and students have discovered that sea turtles use the earth’s magnetic field to navigate to nesting areas, you could have some fun exploring using micro:bit’s compass (magnetometer) to illustrate this.

**micro:bit turtle-safe beach light**

* Explain that you are going to work through an example together – creating sea turtle safe beach lighting using micro:bit .
* Recap / explore what the issues are around beach lighting and hatchlings and how a micro:bit beach-safe light could help (**slide 6**).
* Explore how the beach-safe light could work. The example prototype uses micro:bit’s LED to emit a low wattage, red light in a turtle shape (see algorithm starter and code on **slides 7 and 8**, published project [here](https://makecode.microbit.org/#pub:_XkEHdPCR54kr) and supplied **Sea turtle light hex file**).
* Depending on your students you could:
  + Use the example to introduce theory and application of selection (IF statements), sensors (light sensors) and outputs (LED display).
  + Explore what the problems/issues with the example prototype are.
  + 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.
  + Give students other materials to create a full light prototype.
  + Let students create their own prototype for helping turtles that is not a beach light.

**Review**

* Discuss with students what they have learnt from their exploration of protecting sea turtles and the prototype they have created (**slide 9**).
* Allow students time and space to consider other ways they could help sea turtles, or other endangered marine life, through the design challenge.

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