



arm

Lesson 31

IoT Tree Protector



arm School Program

THE GLOBAL GOALS

For Sustainable Development





INCREASE SCIENTIFIC KNOWLEDGE, RESEARCH AND TECHNOLOGY FOR OCEAN HEALTH

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.

Setting the scene

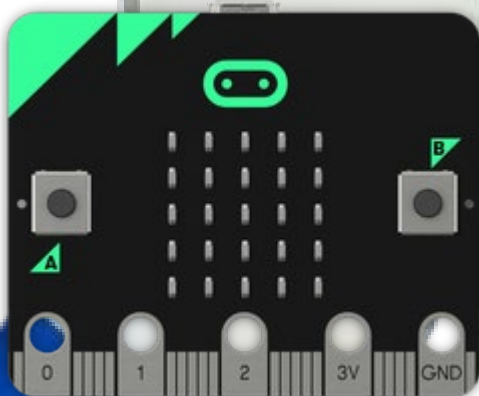
A group of marine scientists have asked you to develop a prototype floating sensor node that they can leave in the ocean and that transmit data to them so they can study climate change in the sea.



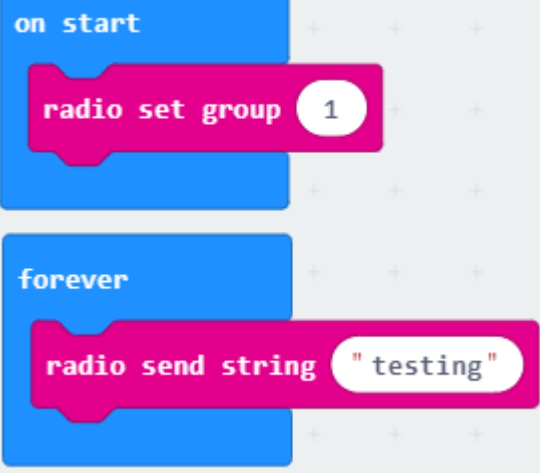
Success criteria

- Design and create a floating sensor node using a micro:bit
- The beacon must transmit sensor data to a gateway micro:bit every 10 seconds
- The beacon must also transmit it's unique ID number (there will be lots of nodes!)
- The gateway micro:bit must be able to show the data on its LED screen

NODE



On floating sea sensor

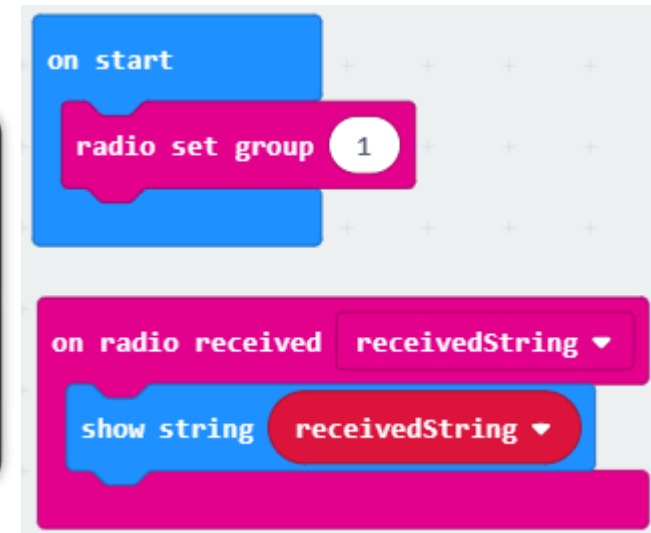


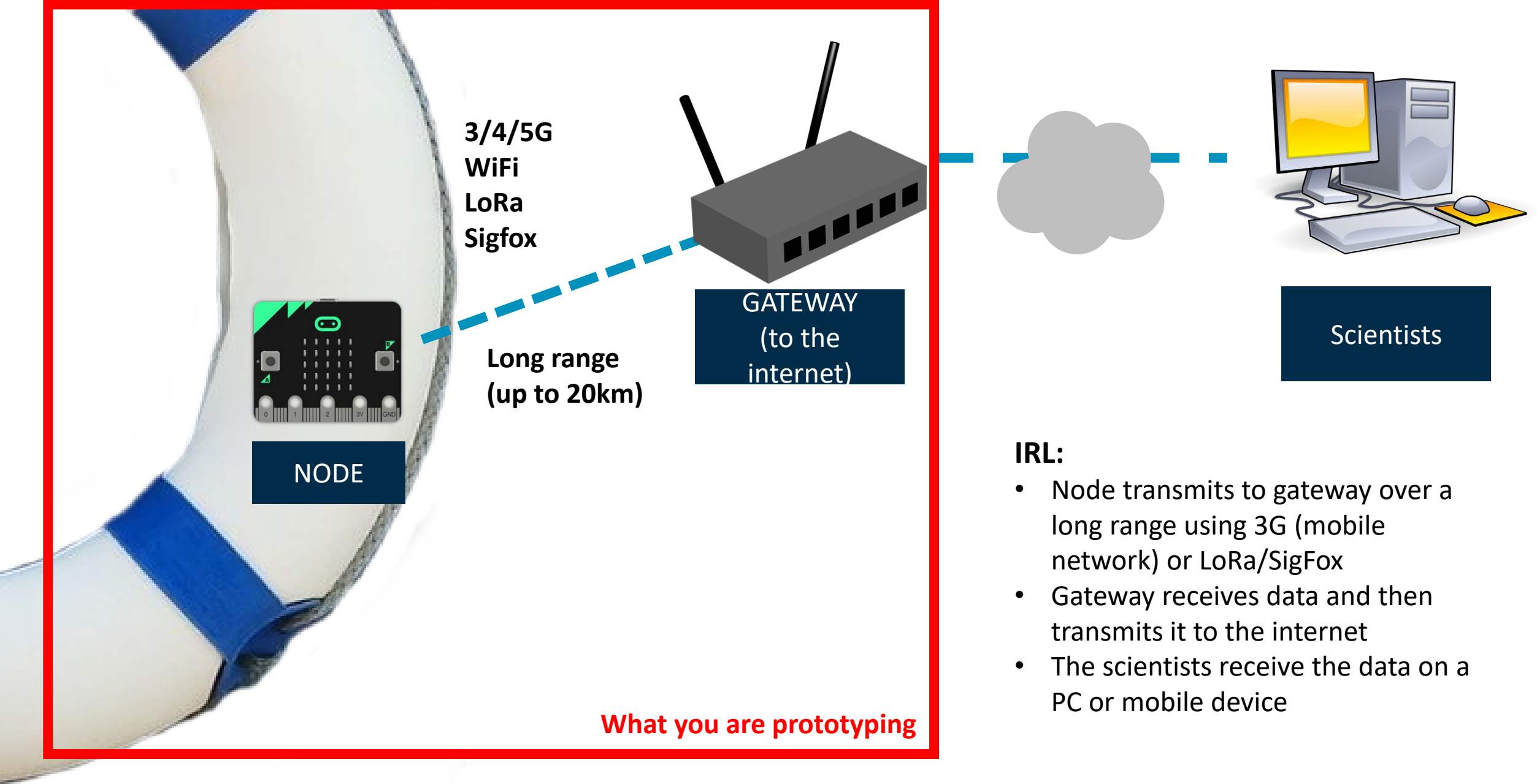
Radio blocks

GATEWAY
(to the internet)



With the scientists on a ship





IRL:

- Node transmits to gateway over a long range using 3G (mobile network) or LoRa/SigFox
- Gateway receives data and then transmits it to the internet
- The scientists receive the data on a PC or mobile device

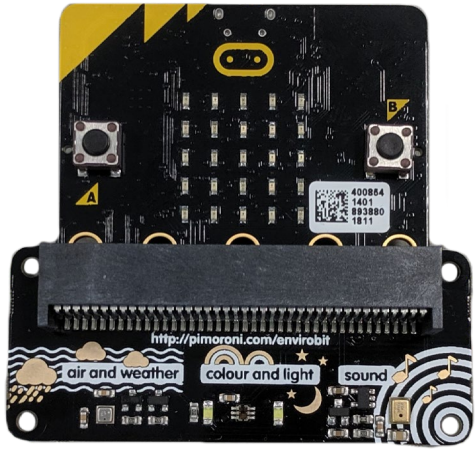
Input process output

Input	Process	Output
Water temperature Air temperature Air pressure Humidity Air quality Light intensity Accelerometer (waves) Compass	Format data Unique ID number	Transit data via radio Transmit unique ID number



Input	Process	Output
Data via radio Unique ID number via radio	Format the data	Display the data on the LEDs

Other ideas using peripherals



Enviro bit

Additional sensors for:

- Air and weather
- Colour and light
- Sound



Air quality sensor

Combined pressure and Humidity

Needs extra cables and soldering



Scroll bit (for Gateway)

LED matrix

More LEDs to display data



Moisture sensor

Could be used to measure rainfall or to alert the scientists if the node sinks

Needs crocodile clips

Group task:

- Get into pairs/groups
- Use the Ocean Health Monitor worksheet to help you design and create your product
- The product must meet the success criteria
- Use the IPO worksheet to design further features
- Make a prototype to test your product

Please note:

The prototype does not need to be tested on water! The scientists are only interested in the sensor data and not whether your prototype can actually float at sea.

Micro:bits are not waterproof!

Goal 14 - Life under water – Ocean Health Monitor

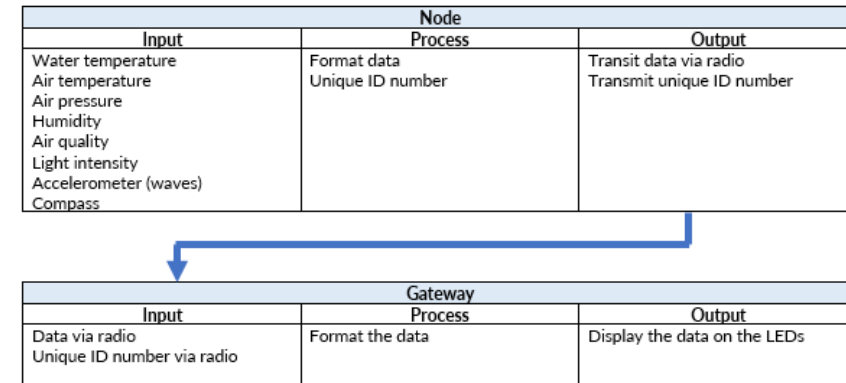
Getting started

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Input process output (IPO)



Pro-tip

The scientists want data from as many sensors as possible, if you can use other sensor peripherals make sure that you make full use of all the additional sensors.

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Thank You

Danke

Merci

谢谢

ありがとう

Gracias

Kiitos

감사합니다

धन्यवाद

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