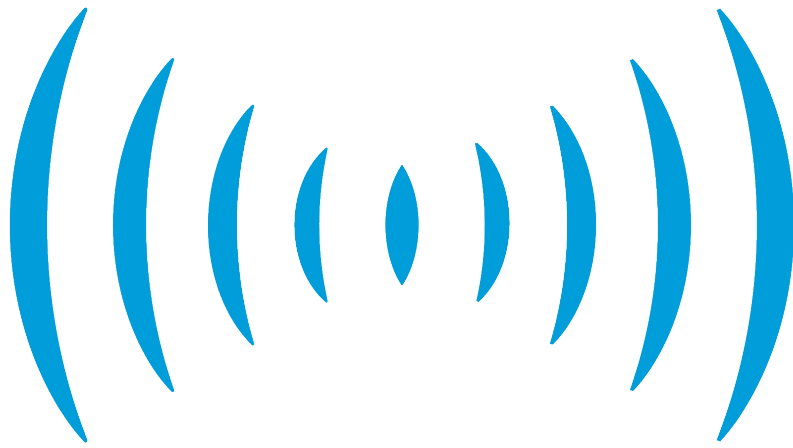


BRITISH SCIENCE WEEK

2023

**School and
Group Activity
Ideas**



The theme for this year's British Science Week is Connections. In the amateur radio community, that is what we do all the time! We connect with fellow amateurs, in this country and around the world, using radio waves.

Amateur radio links with STEM

There are so many cross-curricular ideas with radio communications, including history, geography, mathematics, foreign languages and of course, science.

- How did we connect with one another in the past?
- How did telegraphy develop?
- How do mobile phones work?
- How do we communicate with the astronauts on the International Space Station?

How we can help

There are amateur radio clubs all around the country, whose members would be willing to bring radios into schools and demonstrate radio communications.

The Radio Society of Great Britain (RSGB) can offer activities for all age groups in infant, primary and secondary schools.



Eight-year-old Isabella spoke with astronaut Kjell Lindgren as he passed over her house 400km high up in space using amateur radio frequencies.

Early years foundation stage (EYFS)

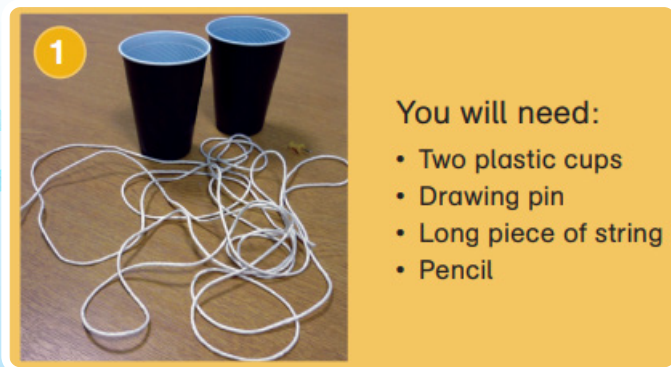
A simple way to connect

The simplest way to connect to another person across a room, without shouting, is to use the classic yoghurt pot telephone.

Activity

This website can show you how to build a yoghurt pot telephone:

<http://images.scholastic.co.uk/assets/a/7b/9a/activity-sheets-victorians-2-578219.pdf>



The pupils may have heard police or ambulance crew saying over, so they will learn its importance to know when the other person has finished speaking.

Communicating from space

At that age, the pupils love everything to do with space. Have they seen the ISS in the night sky? During British Science Week on Sunday 19 March, it will be visible from 20.07 to 20.10 in the southwest. In the following days, there will be other opportunities.

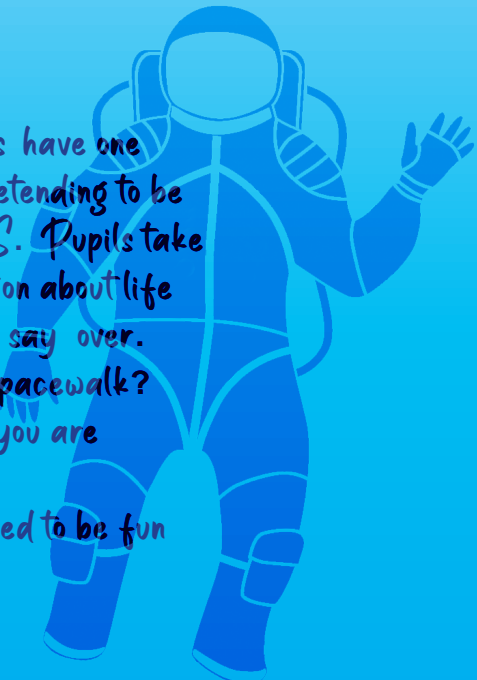
How do astronauts on the International Space Station connect with Mission Control on Earth? They can't use mobile phones! They use radio communications.



Activity

Using two PMR radios have one pupil outside the room pretending to be the astronaut on the ISS. Pupils take it in turns to ask a question about life in space remembering to say over. What's it like doing a spacewalk? How do you sleep when you are weightless?

This activity is guaranteed to be fun for all the pupils.



Primary (Key stages 1 and 2)

The activities at EYFS are applicable to primary age pupils too.

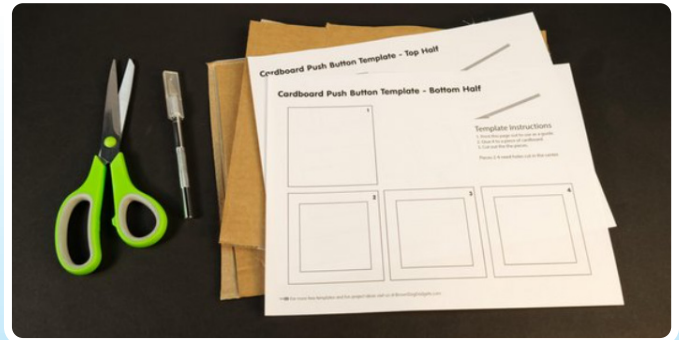
Investigation

The pupils can investigate the history of communications. In 2005, on the 200th anniversary of the battle of Trafalgar, beacons were lit across the country. What other methods use light? Elon Musk's Starlink satellites communicate with Earth using radio waves, but they also communicate with each other using laser light.

Activity 1

The pupils may have studied electricity, so they could make a circuit using an LED and a homemade push switch:

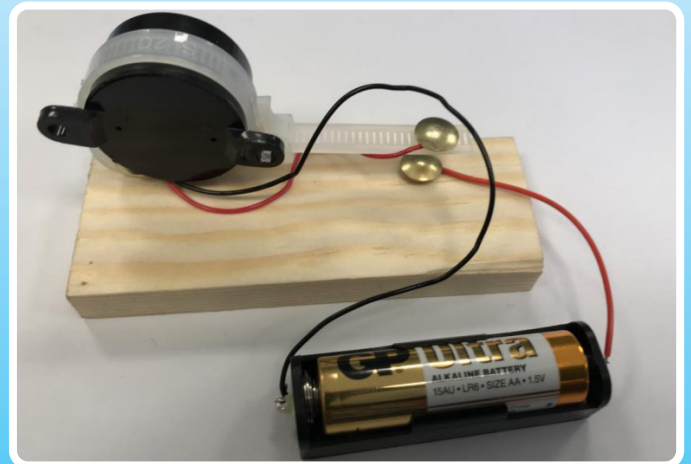
<https://learn.browndoggadgets.com/Guide/Switch+-+Cardboard+Push+Button/356>



Activity 2

They could also make a cable-tie, or 'Snail' Morse key. The Snail Morse Practice Key kit is made available by Trevor Hughes, G4WKJ who is an RSGB volunteer at the RSGB National Radio Centre. The Snail Morse key has been made and used by hundreds of youngsters as they have enjoyed learning about Morse Code.

The instructions on the RSGB website describe how to build the kit: [the_snail_practice_morse_key.pdf](#) (rs.gb.services)



Primary (Key stages 1 and 2)

Activity 3

Using a Morse Code crib sheet, they send messages to each other. A short flash of light is a dot, such as the letter E, and a longer flash is a dash, such as the letter T. Start with perhaps two letter words, building up, to longer words. In sending Morse, a dash lasts three times longer than a dot. A space between letters is also three times that of a dot.

International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

A	• —
B	— • • •
C	— • — •
D	— • •
E	•
F	• • — •
G	— — •
H	• • • •
I	• •
J	• — — —
K	— • —
L	• — • •
M	— —
N	— •
O	— — —
P	• — — •
Q	— — • —
R	• — •
S	• • •
T	—

U	• • —
V	• • • —
W	• — —
X	— • • —
Y	— • — —
Z	— — • •

1	• — — — —
2	• • — — —
3	• • • — —
4	• • • • —
5	• • • • •
6	— • • • •
7	— — • • •
8	— — — • •
9	— — — — •
0	— — — — —

Who was Samuel Morse ?

What is SOS in Morse ?

Knowing this could save your life.



The volunteer radio amateurs could demonstrate Morse Code on a proper Morse key. Children could learn their name in Morse and take home a certificate of their achievement.

Further information

Explain how NASA is using light for their deep space network
https://www.nasa.gov/mission_pages/tlm/dsoc/index.html

Secondary (Key stage 3)

The electric telegraph system revolutionised the way the British Empire connected with its colonies. The topic of connections can lead to discussions in history, geography and science.



BBC micro:bit

Schools will have the BBC micro:bit Version 2, possibly in the technology department or even borrowed from the library.

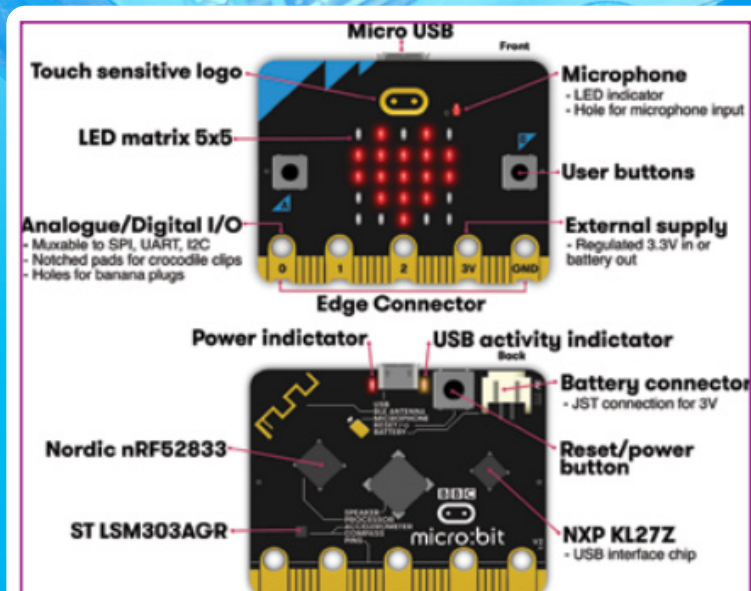
Activity 1

The pupils can set up a telegraph system to send Morse code to one another. The coding is very simple.

Activity 2

With the Version 2 of the micro:bit they can also communicate with the built in radio, as it has a loudspeaker. You can read more about how to do this in article published by the RSGB:

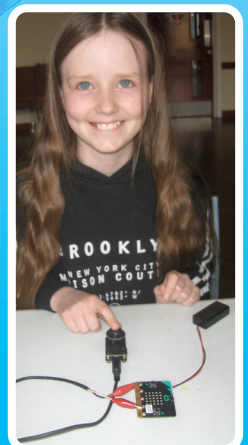
https://longislandcwclub.org/wp-content/uploads/2021/08/p56_57_microbit_radcom_aug212.pdf



The front and back of BBC micro:bit.

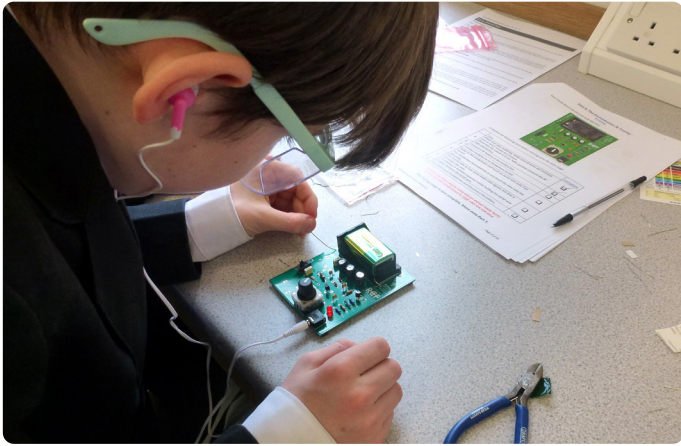
At 45 minutes 36 seconds into this video you can see Milly demonstrating how to send Morse on the micro:bit. She is using a Morse key which she made herself.

<https://www.youtube.com/watch?v=pHQsftZhogY>



Secondary (Key stage 3)

The Raspberry Pi and Arduinos with LoraWAN networks could also be used to demonstrate wireless communication.



FUNcube

The RSGB can offer another activity, associated with satellites. There is an educational satellite in orbit around the Earth, called FUNcube. It is beaming telemetry data and messages, called fitter messages, from 600km up in space.

Activity

Pupils can download this data using an antenna and radio receiver, which some radio clubs may possess. During British Science Week, there are some excellent opportunities to catch the satellite passing overhead in the afternoon. The radio volunteers will know the times exactly.

The fitter message is a special message for schools celebrating British Science Week, congratulating them on their successful download.

The telemetry data can be used to calculate the period of the orbit, from the temperature changes on the panels. Knowing the height of the satellite they can calculate its speed. They could even work out the mass of the Earth from Kepler's third law.



All age groups

Students of all ages could design a QSL/eQSL card. A range of media could be used, including photographs and designed graphics, as well as hand drawn images. This could be linked to a history activity looking at QSL cards from the past. Alternatively, it could be considered an imaginative piece – design a QSL from your dream location, desert island, space etc.

Further information and support

If you would like to chat to someone about these ideas, please contact

RSGB Learning Team volunteer John Hislop, G7OHO:

g7oho@rsgb.org.uk