

British Science Week 2023

British Science Week 2023 ran from 10 to 19 March. The week is an annual celebration of science, technology, engineering and mathematics (STEM). The theme this year was 'Connections' which fitted perfectly with amateur radio. As part of its commitment to STEM and youth, the RSGB supported a number of events across the country, with many RSGB volunteers going into local schools to demonstrate the exciting link between STEM and amateur radio. Here are some reports of the amateur radio activities they enjoyed.

Norfolk Amateur Radio Club (NARC)

Norfolk Amateur Radio Club took part in British Science Week on 11 March with a display and radio demonstrations at **Norwich CNS School**, where NARC meets.

The school's "Super Science Saturday" featured a whole host of different events and NARC was only too happy to assist. CNS was one of the schools that made an ISS contact with astronaut Tim Peake. Steve, GOKYA and club president Malcolm, G3PDH put on a demonstration HF and VHF station using the club callsign G4ARN (Amateur Radio Norfolk). NARC also demonstrated a Flex Maestro, which was connected via the internet to Malcolm G3PDH's home HF station, showing how amateur radio has moved with the times. While Chris, GODWV and Andy, MONKR demonstrated a Geochron device with real-time weather, flight information, radio propagation, satellite tracks and much more.

Simon, MOSIH and Sam, M7EBX from the club's "Bright Sparks" group put on an electronics kit display which visitors could experiment with.

Tammy, MOTC showed electronic construction and helped 20 youngsters make their own Morse code keys and buzzers. They were then able to send their name via Morse code thanks to Jim, G3YLA, gaining a special certificate in the process.

Contact was also made with Norwich's twin city of Koblenz in Germany on the 40m band in a regular monthly net. Other HF contacts were made with the USA, Canada, Finland, Germany, Malta, Russia, Switzerland, Italy and Cyprus via SSB, CW and FT8. Other displays demonstrated TV, voice, digital and satellite communications and attracted a lot of interest.

Steve Nichols, GOKYA

Demonstration of an electronics kit.

NARC HF operating station.

Tammy, MOTC overseeing construction of a Morse key.



Jim, G3YLA issuing a participation certificate for sending Morse code.

Mallaig High School Amateur Radio Club

The club really enjoyed participating in British Science Week 2023. We started off 'connecting' with Southville Primary School pupils operating GB1SPS on 40m, thanks to Andy Jenner, G7KNA.

Mallaig High School pupils operating GM5MHS went on to communicate with a number of Irish and G stations, including Morar-based Gordon operating G4OAS/A whilst holidaying in Bolsover, England.

Aberdeen Amateur Radio Society members were also very supportive and our Foundation Exam candidates thoroughly enjoyed communicating with everyone on HF.

Many thanks to John Hislop, the RSGB and the British Science Association for organising the various activities.

Lyall Smith, GM5MHS



Lyall Smith, GM5MHS and students from Mallaig High School enjoying operating.



[rsgb.org/bsw](https://www.rsgb.org/bsw)

Hilderstone Radio Society

The Hilderstone Radio Society helped **St Peter's CE Junior School** in Broadstairs to celebrate British Science Week. The seven-year-olds in Year 3 had great fun sending Morse code messages to each other using a flashing LED. One girl said "This is the best lesson ever! It is so much fun!"

The Year 6 pupils were challenged to write a computer program to run on an Astro-Pi, which would be displayed to the astronauts on the International Space Station. With 50 pupils in the school hall, working on their iPad or laptop, that was indeed a challenge, especially as the coding was in Python!

The Year 4 classes received a personal message from Space. We talked about satellites and how Sir Isaac Newton realised that they were possible by thinking about what would happen to a cannon ball if it was fired at the right speed. They were surprised at how small the FUNcube satellite is and how it is able to send messages and data down to Earth. The three classes had an attempt on different afternoons. At the set time, the satellite came over the horizon and we tracked it across the sky. Their personal message was "Congrats to Year 4 at St Peter's School in Thanet from FUNcube-1 in Space." We also received comments such as "Thank you for making this afternoon so special for me and my class!" and "It was an amazing afternoon!"

Thanks go to Matt Payne, MOLMK and Phil Challans, M5PGC for volunteering.

John Hislop, G7OHO



Students discussing Morse code.



A keen student enjoys an antenna demonstration.

South Bristol ARC

As part of British Science Week, South Bristol ARC members Ken, G4XCB, Kevin, 2EOAWX, Dan, 2EOIGS, and Andy, G7KNA joined **Southville Primary School** to introduce their Year 6 classes to wireless communication and the BSW theme of 'Connections'.

Year 6 students are aged 10 to 11 and are in the last year of their primary education, ready to transfer to secondary school in September.

Through prior consultation with the school, it was determined that we would showcase three activities that the students could participate in with supervision:

- An HF SSB station using a Yaesu FT-991 and MFJ-993 Auto ATU feeding an 80m doublet erected as an inverted-v in the school's playground.
- A SSTV operation with TX and RX on either side of the room. Transmissions came from a Yaesu FT-857 with a five-eighth's wavelength whip. SSTV tones were created by a Windows laptop running MMSSTV via a Signalink USB audio interface. Event-specific images featuring the special event callsign GB1SPS and images associated with the school, local area or the radio club were used throughout the day. There were two receiving stations: the first featured a handheld placed against the internal microphone of an Android Tablet running ROBOT36. The second used a Yaesu VX-5 handheld with its audio fed into the microphone input of a Linux laptop running QSSTV.
- A small number of PMR 446 handhelds were available for the students to use within the playground, which proved a great hit.

Prior to the event, the students had been invited to create a QSL card featuring the special event callsign GB1SPS. This imagery had been used in a unique QSL card employed in electronic QSL systems such as eQSL.

On the day, following an introduction to radio waves, transmitters, antennas, the phonetic alphabet and the ionosphere, each class split into groups spending time with the HF SSB station, SSTV activity and using handhelds.

Under the supervision of Ken, G4XCB, the children activated special callsign GB1SPS (Southville Primary School) on HF. Early in the day the 40m band was a little flat and scheduled QSOs with the NRC and Mallaig High School were a struggle. Switching to the 20m band yielded more interesting results. As a result of the conditions, a few of the children's CQ calls went unanswered. Undeterred by this they kept on calling! By the end of the day, different groups had exchanged greetings messages with stations in Sussex, Norfolk, Kent, Buckinghamshire, Northern Ireland and Germany as well as Mallaig High School, GM5MHS.

The students enjoyed getting to grips with SSTV, sending images relating to the school and Bristol to classmates.

When the sun came out it was a perfect opportunity to get outside and

One of the students experimenting with a handheld radio in the playground.

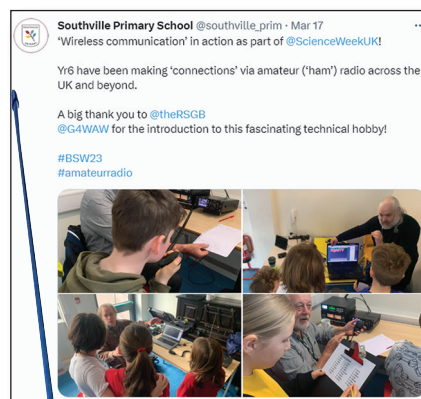
use handheld radios, with many children choosing to communicate their names and messages using the phonetic alphabet.

The children were really engaged in the various activities. Comments included: "It was exciting to see pictures being sent over radio waves"

"It was really interesting and fun to speak with a person from Germany without a phone. He said his name was Rolf and it was sunny in Germany!"

Andy Bowman, Headteacher at the school said, "Connection is one of our school values, and for our children to be able to experience global connection in such a tangible way was really exciting. Amateur radio offers endless engaging STEM learning opportunities, and it was great to see our children experience something new."

RSGB Regional Representative Andy Jenner, G7KNA



A social media post by Southville Primary School during the day including images of the activity day. Top left: A student passes greetings messages using an HF SSB transceiver supervised by Ken, G4XCB. Top right: Kevin, 2EOAWX explains SSTV reception to Year 6 students. Bottom left: Andy, G7KNA explains SSTV transmissions to Year 6 students. Bottom right: Ken, G4XCB explains the phonetic alphabet during a pause in greetings messages.



This is the eQSL card using a graphic designed by students at Southville Primary School.

Swindon & District Amateur Radio Club

On a very cold and windswept day on 10 March, Dominic Wilkinson, 2EOWHQ and I attended **UTC Swindon** to set up and demonstrate amateur radio in support of British Science Week.

UTC Swindon is a University Technical College that opened in September 2014 for students aged between 14 and 19. The college/school specialises in engineering and is sponsored by Oxford Brookes University and Johnson Matthey Fuel Cells.

Using the callsign GB2BSW and operating on HF on the 40 to 15m bands with a very simple inverted-v dipole, we showed the students how easy it was to communicate using radio waves.

FT8 being our primary mode, it was easy to show the students where our signal was being received almost instantly using PSK reporter. Using this software, it also allowed us to explain the change in ionospheric propagation as the day progressed and on multiple bands.

For most of the students and staff this was their first experience of amateur radio, however this did not curb their enthusiasm and engagement with us. Many radio-related subjects were discussed during the day, as we cycled between study groups, including how many types of radio systems are used by us all to go about our daily lives, for example wi-fi, Bluetooth, cellular, NFC etc. More importantly we stressed the necessity for new talent to take up radio/electronic-based careers in the future. It was pointed out that radio in all its guises was not going to go away – if anything, we will become more dependent on being 'Connected'.

Both Dom and I hope that we, in some way, interested those that we met and have encouraged some to look further into the subject. We are planning to return to UTC to hold some radio/electronic workshops as a taster route into the hobby.

I would like to thank Neil Pouney, Head of the School, all the staff and students for making both Dom and I feel very welcome.

Straight after the BSW event Dom and I were invited to **Melksham Oak Community School** to demonstrate amateur radio and the wider use of radio and telecommunications in their STEM careers event. Again, we demonstrated FT8 and the propagation tools we can use in real time. It was certainly an interesting geography lesson for some!

We have been invited back to this school later in the year to attend another STEM/Careers/technology day.

I hope that this local outreach will continue and develop, spreading the word about amateur radio and encouraging those we talk to, to consider studying for an amateur radio licence.

I would like to also thank Dom and the company he is employed by for allowing him to take two 'volunteer' days off work.

RSGB District Representative Simon Harris, G4WQG



Dominic Wilkinson, 2EOWHQ operating.



Some of the students who took part in the event.



Dominic Wilkinson, 2EOWHQ at the station controls.

Bishop Auckland Radio Amateur Club (BARAC)

This year we decided to use the Extended Freedom Network to provide voice contacts from across the world to budding students and teachers in our local primary schools who had requested to take part using amateur radio to provide the medium for this year's theme of Connections. In the run up to British Science Week, members of the club had briefed amateurs on the Extended Freedom Network that we would be active from a total of three primary schools across the week and that they would all be welcome to talk to the staff and pupils during our time at each school.

Radio Participation Certificates were designed and printed in advance by Gareth and Helen, for anyone who talked on the radio. Cable ties had drawing pins inserted into them in preparation of the students being able to build and take home their very own snail Morse keys from parts very gratefully supplied by RSGB headquarters and BARAC.

On Monday morning our team assembled and started to set up all of the equipment and erected antennas for both HF and VHF operation utilising fibreglass masts tied to fence posts and storage container doors. Due to high winds these were limited in height due to the strong winds that were forecast for at least the early part of the week.

The pupils and staff at **Staindrop Church of England School** had seen things happening outside of some classrooms and were very interested. The callsign in use was GB4SCE, the suffix of which stood for Staindrop Church of England School.

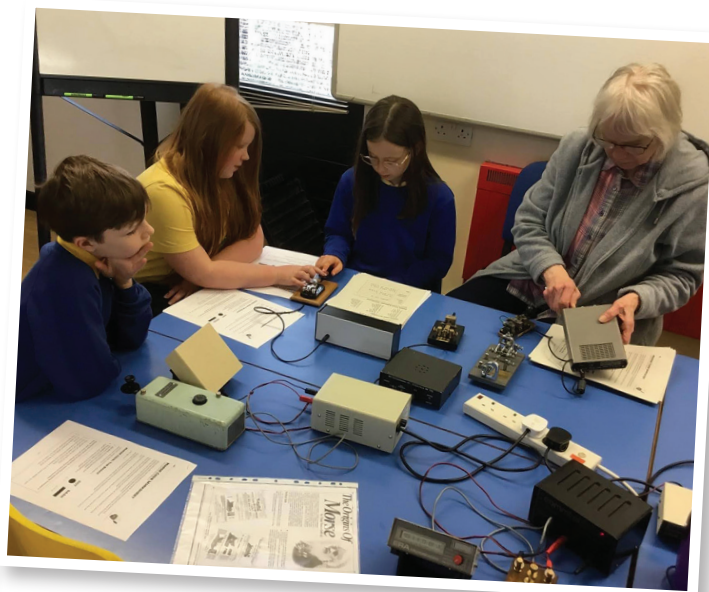
Val and Ken, G7BPN, set up several Morse key and readers along with crib sheets to teach the basics of sending code.

Kathleen, MORRL and Tim, MOACV, had all of the parts to allow the building of Snail Morse keys.

Helen, MM7HQA and Gareth, GMOWUR ensured that everyone had a prepared greetings message and a knowledge of the phonetic



Students building Morse keys.



Learning Morse with Val.

alphabet before talking on a VHF radio connected to the Extended Freedom Network. If there happened to be no operator available on the network a second VHF radio was ready to talk to amateurs through GB3CD, one of our local repeaters.

Brian, G7OCK and Liam, 2E0LDQ were demonstrating an HF data station normally running FT4 and FT8. Contacts were also displayed on a world map to show how signals were being refracted by the ionosphere.

Ian, G7ESY, explained a brief history of radio which included early experiments leading to Marconi crossing the Atlantic Ocean, the Titanic requesting assistance through to broadcasting, mobile phones, satellite communications and space stations, including operation of GB1SS.

All pupils and staff who made a contact on the VHF radio received their own Radio Participation Certificate signed by one of the amateurs present.

At the end of the school day all of the equipment was disconnected, packed up and put back into our cars ready for day two.

On Tuesday morning we arrived at **Hunwick Primary School** and proceeded to assemble and connect all of the equipment ready for starting to operate after lunch using GB4HJS. Antennas and masts were fastened to fence posts which happened to be conveniently situated just outside a classroom window and were more than sturdy enough for our requirements.

The operators were all set up as on Monday, however Kathleen and Liam were not available. Keith, M7BYD replaced Liam on the HF data station.

The pupils and staff again worked their way around the room going from section to section so that by the end of the school day everyone in the first class had taken part in all activities.

Then it was Wednesday, day three. Kathleen re-joined us and we started mid-morning as there were more pupils involved than we could accommodate in the afternoon.

All staff and pupils had their Snail Morse keys and Radio Participation Certificates, once again duly signed by one of us.

On Thursday, day four, we arrived at **St Andrew's Primary School** mid-morning to operate as GB2SPS. Once again, all of the equipment was assembled and connected. This time, antenna supports were in the form of fence posts and storage containers within a reasonable distance of the window of the classroom that we had been allocated for both days.

For our last two days, Keith was not available but we had Liam back to help on the HF station.

Operation started after lunch with small groups of pupils and staff gradually working their way around the sections set up around the room. As usual this went on until the end of the school day by which time there were many happy faces holding onto their Snail Morse keys and Radio Participation Certificates.

We had an email from Andrew, G7KNA on Wednesday who asked if we could try to connect to Southville Primary School where South Bristol ARC would be operating as GB1SPS on Friday 17 March. We confirmed that we would attempt this using HF SSB voice.

On Friday, our fifth and final day, we were asked to start operation at 10am. So we arrived in time to accomplish that. With many pupils to get through, we worked up to lunch time, took a well-earned break and then started again after lunchtime until the end of the school day.

Brian and Liam connected a microphone to the HF radio at the allotted time, tuned to the required frequency but GB2SPS could not hear GB1SPS. We were rather disappointed, but understood that the propagation was just not suitable.

During the event we were using a computer logging system and Gareth had it set up to calculate the distance of each QSO and then to keep a running total of the distance covered. Final totals are in **Table 1** below.

Many thanks go to all of those involved, BARAC members and the RSGB for providing much of the equipment used to build over 100 Snail Morse Keys that were given to many of the pupils.

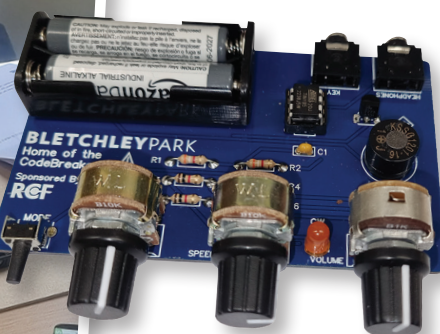
RSGB Regional Representative Ian Bowman, G7ESY

TABLE 1: QSO Statistics

Callsign	Students	Number of QSOs	Distance in Kilometres	Distance in Miles	Times around the Earth
GB4SCE	52	54	116072	72124	2.89
GB4HJS	72	112	338319	210221	8.44
GB2SPS	44	125	402294	249974	10.03
Total for the week	168	291	856686	532319	21.36



Students constructing Morse tutor kits.



Morse tutor kit supplied by Kanga Products.

RSGB National Radio Centre (NRC)

This year the RSGB and Radio Communications Foundation (RCF) came together on Saturday 18 March to run an event for young people at the RSGB's National Radio Centre at Bletchley Park.

Despite a train strike, four volunteers from as far away as Somerset and Kent got up at the crack of dawn to make their way to Bletchley in time to set up for the first arrival of participants.

At the start of the day, Martyn Baker, G0GMB of the RSGB National Radio Centre welcomed everyone to Bletchley and the NRC. Trevor Gill, G8IBO (RCF Trustee) echoed the welcome on behalf of the RCF. He explained the massive strides made in radio engineering from Marconi's first message sent across the Atlantic by Morse code, through the first transatlantic message by amateurs a century ago to the mobile phones that we take for granted today. He encouraged the young people to consider an engineering career and the opportunities presented by amateur radio as a way into such a career.

The event ran in two sessions. After a short safety briefing, the young people who took part each had the chance to build and take home a Morse tutor kit supplied by Kanga Products. During the day fifteen young people built a kit and all of them worked first time. Even those who had never used a soldering iron before soon got the hang of it, and no dry joints were spotted. As well as generating random morse, the kits also allowed a key to be plugged in for sending practice. By the end of the day, a few messages were being sent between participants and some also had a go with a paddle keyer. It was great to see both boys and girls enjoying the event, some accompanied by parents taking a keen interest.

Scholarships

The RCF also sponsors a number of Arkwright Scholarships. These are for talented teenagers who are studying A Levels with a view to moving on to an engineering degree. The event had been advertised to Arkwright Scholars and several were present and able to enjoy the bonus of meeting like-minded Scholars.

Feedback

Everyone seemed to enjoy the event and most also enjoyed the chance to visit the NRC and join in working a pile-up on 40m. We had some very encouraging feedback from participants.

James said:

"Thank you for organising such a fantastic workshop. I really enjoyed the challenge of building the Morse Tutor because it enabled me to hone my soldering skills and better appreciate working with the shape of Morse letters rather than focusing on the dots and dashes.

It was great to benefit from the expert, skilled tuition and the opportunity to catch up in person with other Arkwright Scholars and my sponsorship was hugely appreciated. Visiting the National Radio Centre provided a great insight into the history of radio transmission and Bletchley Park is a fascinating place to explore.

A very big thank you to the National Radio Centre for facilitating such a great event and to the Radio Communications Foundation for sponsoring it."

Daniyal said:

"Me and my friend Sam really enjoyed the event. We have gained new skills such as learning a few phrases in Morse code and learned how to solder."

"We have both been inspired to take a look into amateur radio and are looking at getting a licence. Thank you again for this amazing opportunity."

And finally

A big thank you to all who made the day possible and especially to Steve Hartley, G0FUW who set up the event and Martyn for hosting us so well. We hope we may have inspired a few future amateurs and professional radio engineers.

Trevor Gill, G8IBO

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