

Cyber Schools Hub Newsletter

July 2019

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Hub and Spoke School Activity

Newent School visit The National Museum of Computing

Newent School Y9 students visited The National Museum of Computing (TNMOC) this month. This is the second time Newent students have visited, the previous time conducting a joint trip with students from Dean Magna School. TNMOC have put together an excellent programme for students that supports the delivery of the Computer Science GCSE. Other Schools that have visited include Beaufort Co-operative Academy with Barnwood Park Arts College, Crypt, Cleeve and Ribston Schools. The NCSC team have developed a good relationship with the education coordinator at the Museum and are happy to support other schools who would like to attend

Bonnie Binary helps Newent with Wearable Technology

As part of the Wearable Tech cross-curriculum concept being run at Newent School to expose more students to Computer Science, the NCSC team funded Bonnie Binary and Codingbug to run 2 half day sessions for 50 Year 7 students on e-textiles. Bonnie Binary is a local e-textile consultancy offering prototyping for e-textile and associated wearable technology products, while Codingbug (<https://codingbug.co.uk/e-textiles-projects/>) was set up to support local code clubs in Somerset. Students had a great time creating their wearable tech. This event follows on from a Dragon's Den event at Newent School, which focused on wearable technology. The school is now looking to run a regular wearable tech focused lunchtime club from September onwards to build on the interest that has been generated.



Wyedean host A-Level Computer Science taster sessions for Forest of Dean Schools

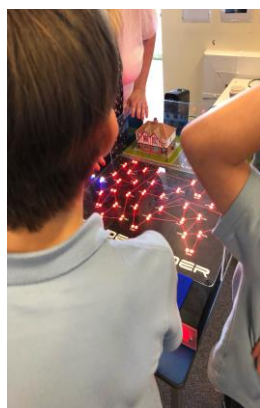
Wyedean School hosted prospective 6th form students for a Computer Science taster session for schools in the Forest of Dean who do not currently have 6th form offerings. Students from Forest High School, Dean Academy, Five Acres High School and Dene Magna School (who open their new 6th form this September) were invited to try and entice students to choose A-level Computer Science in September. These sessions were well attended, and it will be interesting to see the take up in September

following GCSE results. Dene Magna School will be offering Computer Science in their new 6th form as an option but obviously did not have anything currently to attract the students to choose the subject. Wyedean School teachers and students have also visited the likes of Forest High School to highlight Computer Science to prospective A-level students earlier in the year.

200 Primary school students in one day get Computer Science/Cyber Experience

Wyedean School welcomes 200 Year 5 Primary school children for a full day of experiencing Computer Science and Cyber Security. The aim of the day was to allow students to sample lessons that primary school teachers find more difficult to deliver due to equipment demands, knowledge, skills and physical space; inspiring year 5 students into developing knowledge of Computer Science and Cyber Security. The sessions and activities that were run throughout the day demonstrate the diversity of Cyber and the number of strands in Computer Science that linked across the curriculum. Staff from Computer Science, Science, Maths, DT, Art and Drama were all involved, highlighting how concepts from all these subjects play into Cyber. Wyedean School wanted this to be a combined school and industry experience for the school. The following companies rallied to support the event:

- BAE Systems
- Deloitte
- Raytheon
- Sopra Steria
- Deep3 Software
- University of South Wales
- Infrastar
- Cygenta
- National Digital Exploitation
- CGI
- Cyber Security Associates



In total over 40 industry staff were involved supporting the event on the day (along with 16 Primary School staff, 40 Wyedean staff members and 38 Wyedean Students). Students were divided into groups of 20 and each had three workshops that were planned to ensure there was a balance in strands of learning. Feedback on the day was immediate from the participating Year 5 students with their smiles and conversation highlighting the knowledge they were learning in an inspiring environment. At the end of the event the GCSE Hotel Management Students catered for the event staff with a Harry Potter afternoon tea, as an aspect of their exam. Every item was made from scratch and the event ensured that all students had a real experience of catering and equal opportunities to provisions of food resources.

Wyedean increase KS3 Computer Science teaching hours

Wyedean School report that From September they will be increasing the number of teaching hours of computer science that KS3 students have from 2 hours every 2-week period to 3 hours. The teachers at Wyedean believe that one of the ways they can increase numbers of students selecting Computer Science at GCSE is to treat Computer Science the same as Humanities and Modern Foreign Language subjects which all have increased teaching hours. Newent School also did this at the beginning of the project and will be, on request of Wyedean, canvassing all schools involved in the project to gain an

understanding across the project of teaching time allocation to Computer Science at KS3. The NCSC project team have been trailing and supporting the establishment of Computer Science Clubs/Cyber Clubs at numerous schools, again focusing on KS3 students, to try and get more hours of exposure to Computer Science for students, as an additional concept to help with GCSE Computer Science take up.

Project Schools support Cyber Discovery with video development

Wydean School were approached by the Governments Cyber Discovery programme to help them with the development of a new video to support the programme. The programme visited the school and ran a workshop for Y10 GCSE Computer Science students conducting filming for the video. The students enjoyed the workshop but really enjoyed the freebies including T-shirts to say thank you for their support. Cyber Discovery is a major government funded programme for students in the UK aged 13-18. Cyber Discovery is an important part of the UK's National Cyber Security Strategy and is a unique programme designed to introduce students aged 13 to 18 to the Cyber Security career field, highlighting the potential job roles available and the pathways to achieving them. It involves many stages including an online platform and face-face events. It has 4 stages and the final stage involves elite students competing against each other, supported by industry.

Philosophers Den Launch

Wydean School held an official launch of their Philosopher's Den of Cyber Innovation and Magic. This is a space that the school have built in the corner of their Library, with ideas from both the students and the teachers. It is used to support lunchtime, breaktime and after school Computer Science and Cyber Security events. Given that Wydean School is where JK Rowling attended and the library is named after her, the Harry Potter theme is very much building this space into the fabric of the school. The space includes 10 Harry Potter themed work stations that NCSC funded (as part of a club crate prototype to understand what technology would best support clubs in schools), Interactive Picture Frames (just like on the stairs in the Harry Potter movies) and Hagrid's Cottage (a very upcycled summer house that has been skilfully decorated and animated by staff and students). Local companies also supported the development of the Den, with one company building Raspberry



Pi's into old Computers to re-life the computers for students to use. The Den was officially opened by Madeline from Cygenta, with a range of companies such as BAE Systems, Cyber Security Associates, CGI, Sinclairs, SWRCCU and Cygenta in attendance. The students highlighted not only their Den but also a range of exciting and stimulating Cyber Security and Computer Science activities within it including Robotics, Immersive labs, ethical hacking, programming, golf, drones and playing music on bananas, all with a mix of wizard magic!

CyberFirst Engineering and Creativity Modules completed

Wydean School have completed the conversion of the final two new CyberFirst Adventurers activities, Engineering and Creativity, into modules for both delivery as part of KS3 curriculum and as club

activities. Both versions will be available for other schools to use via the Cyberhub.uk teacher content sharing portal.

Cyber TV episodes launched this month

Several New Cyber TV episodes have been developed this month

(https://www.youtube.com/channel/UCt_9BMkm_nRbLBWq_GTjs8g?safe=true):

- Cyber Security Associates introduce the CyberDea facility and experience days they offer and provide their insight in support for the project.
- Cleeve School female students give their insight into their CyberFirst Defenders Girls only course experience
- Wyedean School female students who took part in the CyberFirst Girls Competition give their views on Sexism
- Wyedean School female students give their views on Identify in the Cyber Age

Other episodes include interviews by Wyedean School students with staff from CGI, Cygenta, and the episodes that were run at CyberUK2019 from Deep3/Cyber Security Associates. More episodes to come.

Cyber Day

Ribston Hall School held a cyber day full of exciting and interesting Cyber Security and Computing activities for all Y8 students. Cygenta, Atkins and Cyber Security Associates (CSA) supported the event, with CSA running an event using their CyberPi kits to investigate wireless network security and DDS. Atkins ran a session on careers in the industry and a Red/Blue team activity. Cygenta ran several sessions around password security, one titled 'Popstars and Passwords' and the other focused on how to hack passwords. Student feedback showed that they found the whole day very enjoyable and informative, with the industry perspectives and activities being the highlight of the day.

Ribston School Female students visit the National Cyber Security Academy



This month 72 Ribston Hall School female students got to visit the National Cyber Security Academy (NCSA) in the University of South Wales City Campus. The University of South Wales (USW) and Welsh Government joined forces to launch this innovative project to help address a shortage of cyber security skills and develop the next generation of cyber security experts. The NCSA is the first of its kind in Wales and a major UK initiative. One of the key themes of the academy is joining together companies in Cyber Security and University students who get to work on projects for the companies. In addition, the Academy and USW are keen to support events for Schools. USW are getting more involved in supporting the project, putting on a day of exciting activities for Ribston School this month and hosting Y8 girls from Wyedean, Ribston, Cleeve and Beaufort schools last month.

Rubik's Cube - It's just an algorithm...

Marling School have provided a new concept that the project is looking to support, using an IOT Rubik's cube. The Cube has a partner app, that has an "algorithm academy" that links well with the subjects of Decomposition, Abstraction and Pattern recognition, and the Computer Science teacher is developing resources for computational thinking. The project is now looking for a company that would be willing to come alongside the school and provide support to the school and this concept.

E-sports - driven by Computer Science

Marling School have provided a new concept where interest in Computer Science is being driven by students interest in E-sports, with a particular focus on strategy, shortest path algorithms and hardware/software importance such as DPI, resolutions, pixel manipulation, to promote enjoyment, and subsequent uptake of Computer Science at both GCSE and A-Level. The NCSC team will be supporting this concept by provided some hardware components for the students to enable them to explore all the aspects within it. The project is now looking for a company that is willing to provide support to the school and this concept.

Who needs Computers in a Classroom to teach Computer Science ?

Marling Schools Computer Science Teacher has provided several of his ideas into the project before the school got formally involved, as the NCSC team had met him at various times around Computing At Schools (CAS) events. The Computer Science teacher has taken this unplugged approach to the next stage by purposefully utilising a classroom with no computers in to teach Computer Science at KS3. This provides a much more flexible space for the use of the project's classroom droprates to support a 'hands on approach' for KS3 students, in addition to utilising companies coming into the school to run activities. The NCSC team are keen to understand and document how this concept develops at school and its impact on numbers taking Computer Science at GCSE.

Dean Academy to offer Computer Science ahead of schedule

The project has been working closely with both Dean Academy's Computer Science Teacher and the Athalston's trusts support Computer Science Teacher, as the school has focused on trying to develop interest in students wanting to take Computer Science as a GCSE option. The main focus has been a dedicated club crate for the school referred to as the "three of everything concept", as it nearly contains 3 of each of the technology in the larger classroom crates, in addition to making use of inspiring educational visits, especially to Cyber Security Associates 'CyberDea' facility in Quedgeley. Additional support on running clubs and KS3 material has also been provided by Wydean school.

The school had originally set a goal of introducing Computer Science in September 2020, however thanks to interest, and some keen lobbying of the SLT by both Computer Science teachers, the school will now be offering Computer Science GCSE after school with 6 boys and 2 girls having signed up. The project continues to support efforts at the school to grow interest in the students.

It's all about Gaming in the Dean... building your own Computer excites...

Teachers and students at The Dean Academy have developed a concept that is looking to use the physical building of gaming computers to interest KS3 students into taking Computer Science at GCSE. Most students have never had the opportunity to build a computer from scratch, especially one that is they good enough to play Computer games on. The concept is based around having a set of

components and peripherals to facilitate students building, playing on and then disassembling computers, so that other students can do the same. While the NCSC is funding the initial set of components, if there are any companies that would like to support the school, by staff coming into the school, or by donating components from computers they no longer require, then please get in touch with Madeline (Madeline.h@Cyberhub.uk) who will facilitate.

Outreach

Several project schools visited primary schools this month to undertake Computer Science/Cyber security focused outreach including Denmark Road HSFG, who visited Kingsholm Primary School, and Beaufort Co-operative Academy, who visited Kingsway Primary School. The project has supported both outreach and inreach events by the Secondary Schools by providing classroom dropcrates of technology for the students to use, with the Sphero and Ohbot robots being a very popular choice with both teachers and students.

Industry Engagement and Support

Lockheed Martin offer Work Experience for the first time

Staff at Lockheed Martin working closely with the Computer Science teacher at Beaufort Co-Operative Academy, facilitated 3 students for a week's work experience opportunity. This is the first time Lockheed Martin have been able to support work experience at their Cyber Works Centre in Gloucester, with some of the activities undertaken being funded by the NCSC project team.

The students spent their first four days making DARCCs (Damn Vulnerable RC Cars) and learning various techniques to exploit and then protect them. This also gave them an opportunity to get hands on with tools they haven't had a chance to use in school; including software defined radios, oscilloscopes and Wireshark. Over the course of the week the students undertook workshops using each of these tools with real world contexts, such as performing teardowns of routers and sniffing on their other's Wi-Fi traffic. Armed with the knowledge of how to use the tools they became each other's Red team then switched back to Blue to protect their own cars.

Throughout the week the students spent time with CyberFirst students on summer placements with Lockheed Martin, fulltime employees and managers to learn about all the different ways into industry and what the company does.

Their STEM activity was rounded off by preparing and then providing a short presentation to stakeholders about what they had learned. This left Friday free to join one of Lockheed Martin's community outreach events – volunteering at the Orchard Trust where they learned another new skill for building fences on the small holding. As well as Lockheed Martin personnel and the work experience students, the team included CyberFirst summer placement students, a teacher from Homleigh Park High School, and a new employee due to join Lockheed Martin in September. Following the hard work completed by the team, they had a BBQ social with the manager of The Orchard Trust to complete the day.

This was the first time Lockheed Martin's Cyber Works Centre has provided a work experience activity for students. We met with the students beforehand to understand their interests and created an activity that would enthuse them but could also be used in modules in the Cyber Schools Hub. As well as the students, we learned a great deal and are looking to complete the artefacts that will be needed in order to create a standalone activity that can be provided to other schools.

Work Experience Opportunities at Cyber Security Associates continues to grow

Cyber Security Associates are once again doing a massive job of supporting the projects schools with work experience opportunities. Last year it was just two students a week but this year they have provided work experience for three students at a time given the interest. Since the beginning of June this has amounted to 17 students getting a fantastic experience, with three more already scheduled for August. As well as schools involved in the project students have also come from Sir Thomas Rich's, Arden Academy, Bredon School, Kings School and Malmesbury.

Deep3 Software Provide Work Experience for Wyedean Students

Deep3 Software have been working hard to develop a sustainable format so they can provide work experience for the project students. The company chose Wyedean School as they already had a close relationship with them. Three Wyedean Y12 students attended a week's work experience, followed by 3 Y10 students at Deep3 Software's Cheltenham office, with Deep3 Staff, students and teachers then meeting up to discuss the key learnings and next steps to be taken, including feedback from both staff and students. The Software Director at Deep3, hopes to be able to get his company into a similar position as Cyber Security Associates and be able to offer work experience opportunities to large numbers of students as he realises the impact this has on their career choices. The NCSC team are looking for more companies who think they can offer Computer Science/Cyber Security work experience opportunities. Deep3 have also provided the following reflection from their staff involved in the work experience:

"Our first experience of offering work experience was incredibly rewarding. Although we have as much to learn from the week as our students, we wanted to provide an experience that young people could thrive in, and thanks to Paul and Callum we made it happen. If at the end of the experience, we've given them the confidence to take on a career in tech, then we've done our best work"

For further information see Deep3's blog postings at:

- <https://deep3.co.uk/blog/a-week-at-deep3>
- <https://deep3.co.uk/blog/6-things-we-learnt>

XQCyber Provide Work Experience for Ribston Hall Students

XQCyber have also been working hard to be able to position themselves to offer work experience opportunities. After an initial successful placement by a Pate's Grammar school student, XQCyber have been working closely with Ribston Hall School to be able to offer two of their female students a week's work experience placement over the summer holidays. The size of the company offering these placements is something that must be considered, with smaller companies having to provide larger amounts of time to support the students during their placement. However, XQCyber have found that with the right student, this 'cost' to the company can be outweighed by impactful work being conducted by them during their placement. XQCyber are looking to split the two placements up between their development teams and their pen testing team.

E-mentoring supports Computer Science students

Following an original idea from Northrop Grumman, Deep3 Software have taken a major step in building relationships with schools by offering to E-mentor students at Wyedean School. Three A-level

students were selected by Wyedean School to be mentored by Deep3 Software staff, predominantly on topics which included block chain, VR and AR research (These are the students EPQ Topic), Machine learning and Java. Feedback from students, teachers and staff have shown that this is a very rewarding experience for all. Northrop Grumman continue to undertake E-mentoring with both Y11 and Y13 Cleeve School students helping them prepare for their recent exams. The Project's E-mentoring programme is also being supported by the Gfirst LEP Educational Coordinator, with supporting documentation and processes developed by both Wyedean and Gfirst LEP. If your company or your school would like to get involved with this trial concept, then please contact the NCSC Team.

NCSC Update

NCCE Hub winner for Gloucestershire is announced

The Governments National Centre for Computing Education (NCCE) project has revealed the first 23 hubs chosen to improve computer science education in England. These new hubs are designed to offer support to primary and secondary computing teachers in the area, including teaching, resources and continuing professional development (CPD) activities. The hubs will cover practical and theoretical aspects of teaching computing and will include links with industry professionals and university academics. The NCCE was established in November 2018. It is backed by £84 million government funding and £1 million from Google to develop training for secondary school computing teachers.

A combined bid involving ADFECTO (<https://adfecto.org.uk/>), Wyedean School and 6th Form Centre, and Pate's Grammar School was chosen to improve computer science education in the county. The NCCE project is focused on improving and increasing the number of Computer Science teachers and includes a new National Computer Science Teacher Training College that is to be built. The project also involves the Raspberry Pi Foundation, STEM learning and the British Computing Society (BCS) who will be developing resources to help train initially non-specialist secondary school teachers to be able to teach Computer Science. It also focuses on training specialist secondary school Computer Science teachers and primary school teachers.

The NCSC team have been asked to be part of a new steering group being set up for the hub and we hope to work closely together to align the goals and objectives of both projects in the county. Further information on the project and what is currently available to teachers can be found at <https://teachcomputing.org/>.

Teacher Conference

The next teacher's conference that project is looking to facilitate will be hosted on the 30th September at Cleeve School. The NCSC team would like to invite as many Computer Science teachers as possible from across all the schools involved in the project, given the fantastic feedback received from the previous conference. The NCSC team are happy to fund cover charges and mileage to enable schools to let their teachers attend. Cleeve School will be hosting in their new 6th form block making use of their new auditorium. Invites have been given out, please contact the NCSC team to confirm your attendance.

Helping GCHQ Celebrate 100 years.

Teachers and students from three schools; Cleeve, Newent and Wyedean were invited to the main GCHQ building to help GCHQ (and NCSC) celebrate its centenary year. While at the building they were part of the first group of people that HRH Prince Charles met, being introduced to him by NCSC's Technical Director Ian Levy. The Prince showed great interest in the projects goals and spent time chatting with the students that the schools had selected to represent them, in addition to the teachers. After meeting the teachers and students, the Prince went on a tour of some of the more secretive work of NCSC and GCHQ and



addressed a much larger audience of GCHQ and NCSC staff. He went to great lengths to show how impressed he was with the NCSC running such a project, with the teachers and students involved, that we were taking such an interest in securing and developing the future workforce for Cyber Security in the UK.

The project teachers and students were thrilled to be given such a fantastic opportunity and to talk to HRH about the impact the project has had on them and their schools.