



Inspiring the Next Generation

Sentinus is the home of STEM outreach activity in Northern Ireland, providing a wide range of STEM programmes, but also aiming to provide flexibility to meet the needs of schools and pupils. We have many years' experience of developing new programmes and tailoring existing programmes to suit the needs of individual schools. If you have a particular curriculum need, or want to incorporate science and technology into a theme or topic, please contact us to discuss your requirements.

Primary STEM Programmes



Junior Innovators

Target Group: Years 1 – 7

Numbers: Class

Duration: 4 – 10 Weeks

STEM project based learning programme initiated by a half day practical Sentinus workshop for pupils and their teacher. Schools can choose from an extensive range of themes and topics to address the science and technology elements of the World Around Us area of learning. Schools display their completed project work at a Final Exhibition.

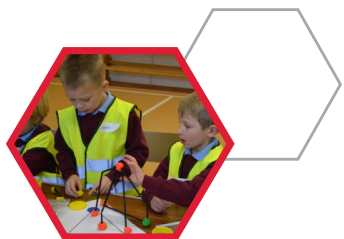
Construction Challenge

Target Group: Years 5 – 7

Numbers: Class

Duration: Half Day

The Primary Construction Challenge is a design and build problem-solving activity for primary schools using K'Nex construction kits. Working in pairs, the pupils are asked to design and build a solution to a "challenge" and their finished models are judged by Sentinus Ambassadors. From a series of regional heats, 25 teams are selected to compete in the Northern Ireland Final.



STEM Challenge

Target Group: Years 6- 7

Numbers: 10- 30

Duration: Half Day

Problem solving challenge for teams of three P6/P7 pupils. Using basic technology materials, teams are required to design and build a solution to a given problem, within a set time. Heats take place throughout Northern Ireland, with 25 teams being selected to compete in the Final at Sentinus Young Innovators. A comprehensive resource booklet is available on Sentinus website to support the teaching of technology.

F1 in Primary Schools

Target Group: Years 4 – 7

Numbers: Class

Duration: 8 – 10 Weeks

The F1 in Primary Schools is a competition for primary schools which requires pupils work in teams to design and manufacture CO₂ powered model racing cars which are raced on a 25 metre track. Sentinus provides training for teachers to help them introduce the activity to their class. Cars are designed on computer and manufactured from card using automatic cutting machines. Basic design templates are supplied and pupils can enhance the design to improve appearance and performance. Teams develop a design portfolio, visual display and verbal presentation in preparation for the Northern Ireland Final.

Family STEM Days

Target Group: Years 4- 7

Numbers: 40-100

Duration: 1 Day

Family STEM Days provide an opportunity for schools to provide activities at weekends, or in the evenings, designed to engage both parents and young people in hands on STEM activities. Content can be themed to support topics being taught in curriculum time.



Primary STEM Workshops

Target Group: Years 1 – 7

Numbers: 60 – 80

Duration: Half Day – Full Day

These one day programmes engage up to 80 pupils in interactive problem solving activities focusing on science, technology and maths, which can be tailored to a chosen theme. Participants work in teams of three to solve a series of problem solving challenges. A wide range of activities available, designed to illustrate science, technology, engineering and maths in a real world context.

Tasty Science

Target Group: Years 5 – 7

Numbers: 60 – 80

Duration: 4 – 12 Weeks

Tasty Science encourages children to explore the food we eat and how it gets to our plates. Starting off with a half day session of practical investigations looking at content and nutritional value of food stuffs, followed by a period of teacher led project work during which pupils carry out practical activity around the theme of food production.

Medics in Primary Schools

Target Group: Years 4 – 7

Numbers: Class

Duration: 8 – 10 Weeks

The Medics in Primary Schools programme is a joint Queen's University-Sentinus activity which brings student doctors into the classroom over a period of 8 – 10 weeks to teach science. Topics covered include healthy skin, healthy heart and lungs, healthy brain and healthy body. Medical students bring science to life for pupils through practical activities, demonstrations and the use of medical equipment.





Summer Camps

Target Group: Years 6 – 8

Numbers: Pupils

Apply

Duration: 1 Week

Sentinus delivers a number of summer camps throughout Northern Ireland each year. Lasting one week, each camp comprises a wide variety of activities with something to suit all participants. While the focus of the activities is on STEM, there is also opportunity for creativity and craft work, design and build challenges and lots of fun and excitement.



Extended/After Schools & Shared Education Activities

Target Group: Years 1 – 7

Numbers: 40- 100

Duration: 1- 4 Hours

If your school has access to Extended Schools or Shared Education funding, Sentinus can provide STEM activities to support links with the community. This is ideal for engaging with the local community and raising the profile of your school. Activities can be themed to link with locally important topics or to support classroom learning.



Big Bang @ School Events

Target Group: Years 6- 14

Numbers: Class

Duration: 1 Day

School based events designed to raise the profile of careers in science, engineering and technology and encourage young people to participate in project based learning. Comprising display of project work, science show and practical activities, the days provide an opportunity for the host to engage with local primary and post primary schools.

Sentinus Research Academy

Target Group: Year 13

Numbers: 100

Duration: 4 – 6 Weeks

Sentinus Research Academy placements give students the opportunity to experience real research and development projects, provided by local companies and organisations. During the programme students play an active role in a research project. Concludes with a celebration day when they display a poster on their research.

Key Stage 3, 4 & Post 16



STEM Roadshows

Target Group: Years 8 – 14

Numbers: 40 – 60

Duration: Half Day – Full Day

One day events engaging young people in hands on STEM activities designed to raise the profile of the subjects. Pupils work in pairs to complete a number of problem solving activities which cover a range of topics and can be tailored to suit the needs of each school.

Sustainable Communities Challenge

Target Group: Years 8 – 10

Numbers: Class

Duration: 2 – 3 Months

This is an extended project linking schools with an engineer to complete a project focusing on future scapes. Students are asked to design their city or building of the future, considering water usage, energy usage, clean technologies, transport and communication. Teams can build a virtual city in Minecraft. Concludes with a celebration day.

Industry Masterclasses

Target Group: Years 10 – 12

Numbers: Whole Class or Selected Pupils

Duration: 1 Day

One day, industry based practical workshops designed to give young people an insight into work in the science, engineering and technology sectors. Combining a range of practical activities with role model presentations, the workshops help inform subject choices and careers decisions.

F1 in Schools

Target Group: Years 8 – 14

Numbers: Whole Class or Selected Pupils

Duration: 2 – 6 Months

F1 in Schools challenges young people to design and build a model of a Formula 1 car, produce a project portfolio, visual display and verbal presentation. On race day, finished cars are powered by compressed CO₂ on a 25m track.

Sentinus Young Innovators

Target Group: Years 8 – 14

Numbers: Class

Duration: 1 Day

Sentinus Young Innovators celebrates the achievements of young people in STEM by providing a forum for young people to display STEM project work and compete for a wide range of STEM Awards. Included in the event is are workshops, STEM shows and careers activities, all designed to help young people discover the excitement of science and engineering and understand career opportunities in the sector.

Experiences of Work

Target Group: Years 8 – 10

Numbers: Year Gp

Duration: 2 Hours

Experiences of Work gives young people an opportunity to hear about a range of STEM occupations and hear about routes into those jobs. Covers a range of STEM sectors and qualification levels and can be tailored to suit the needs of each school.

Team R&D

Target Group: Year 13

Numbers: 120

Duration: 6 Months

A structured programme linking teams of 3 – 5 AS level students with a local company to work on a live engineering project. Teams work closely with a link engineer to develop a solution to the problem through site visits, school based research and a residential workshop at university. Concludes with a celebration day when projects are evaluated by teams of expert assessors.

Employability Skills

Target Group: Years 9- 14

Numbers: Year Gp

Duration: Half Day – Full Day

Sentinus offers a suite of employability programmes for young people covering, interview skills, career planning, learning skills, mental health & wellbeing and personal effectiveness. Each of these can be tailored to suit the needs of students at a local level and can be delivered in either a half-day or full day format.

Digital Makers & Digital Skills



FIRST LEGO League

Target Group: Years 7 – 11 **Numbers:** 25– 30
Duration: 8 Weeks

A STEM programme for teams of young people, to develop key skills crucial for their future careers. Pupils design, build and programme a LEGO robot to solve a series of missions on a specially designed course. Concludes with a competition day when teams compete to complete challenges.

RoboCode Workshops

Target Group: Years 4 – 12 **Numbers:** 60 – 80
Duration: Half Day – Full Day

Introduction to computer programming, using Python, Scratch or PBASIC language to programme M-Bots, Codey Rocky Bots, BoeBots. Pupils work in pairs to programme their bot to enable it to carry out a range of challenges, increasing in complexity with experience.

Machine Learning Workshops

Target Group: Years 8 – 10 **Numbers:** 25 – 30
Duration: Half Day – Full Day

This Artificial Intelligence workshop enables pupils to design a waste sorting device by teaching a Codey Rocky bot to identify a soft drinks can, plastic bottle and a newspaper. After each item has been identified pupils programme Codey Rocky to simulate moving the waste to correct bins. The workshop also enables pupils to design their own facial recognition system using Makeblock software.

Digital Futures

Target Group: Years 8 – 12 **Numbers:** 60 – 80
Duration: 8– 10 Weeks

Introducing young people to computer coding within a business context. Students investigate how digital technologies can be used to address business needs or solve a workplace or social problem. They develop an app for presentation at a competition day as part of Digital DNA business conference. Winners travel to Silicon Valley for five days to visit some of the world's most successful technology companies.

M Bot Challenge

Target Group: Years 5 – 7 **Numbers:** 25– 30
Duration: 4 – 8 Weeks

A robotics challenge for P5– P7 pupils, introduced with a half day training workshop for pupils and teachers. Teams are asked to prepare a co-ordinated routine with their robots (loaned to the school) and attend a competition final to present their routine. They are also asked to complete an unprepared challenge for judges on the day and deliver a verbal presentation.

App Development

Target Group: Years 8 – 12 **Numbers:** 60
Duration: Half Day – Full Day

This programme takes Key Stage 3 & 4 students through the process of designing and building an app. Using Google App Inventor, they will gain an understanding of the process and develop the skills to allow them to create and build an app of their own which they can download to their own mobile device.

Sonic Pi

Target Group: Years 8– 12 **Numbers:** 60
Duration: Half Day – Full Day

Sonic Pi encourages students at Key Stage 3 & 4 to learn about both computing and music through play and experimentation. While having fun, they learn to code, compose and perform. The workshop requires no prior knowledge of music or coding and is great fun for participants who can create their own ring tone for their mobile phone.

BBC Micro:bit Workshops

Target Group: Years 6 – 12 **Numbers:** 30
Duration: 4– 8 Weeks

A range of workshops for KS2, 3 & 4 pupils based on the BBC Micro:bit, introducing them to coding using MicroPython language. Practical exercises using MakeCode (Block Editor) and Mu (Micropython Editor). Programme the Micro:bit as an air guitar, convert text to speech, display images and communicate with other Micro:bits.



C# Workshops

Target Group: Years 12 – 14 **Numbers:** 30
Duration: 8 Weeks

Designed to give Key Stage 4 and AS level students an introduction to Visual Studio, classes, objects and methods. Students learn to create games, manipulate a wide range of variables and control features of the game using input devices. The course aims to help students understand key concepts and areas of coding in C# language in preparation for moving on to A level in Software Systems Development and other computer science qualifications.

Arduino Workshop

Target Group: Years 8 – 12 **Numbers:** 30
Duration: Half Day – Full Day

Arduino UNO is a flexible, easy-to-use programmable microcontroller board that can be integrated into a variety of electronic projects. It can be interfaced with other Arduinos or Raspberry Pi and can control relays, LEDs, servos, and motors as an output. This workshop teaches Key Stage 4 & 5 students to programme the Arduino UNO board to control a range of outputs and sense different inputs from switches and sensors.

Raspberry Pi Lending Scheme

Target Group: Years 6 – 12 **Numbers:** Class
Duration: 1 Month

Sentinus now operates a Raspberry Pi lending library for schools wishing to provide opportunities for students to further develop their coding skills. Schools can borrow 15 Raspberry Pi's plus keyboards, small monitors and mouse devices. The lending period will normally be two weeks, but an extension may be possible if demand is low. Sentinus can also offer support on the types of activities which can be carried out using the Raspberry Pi's.

Tomorrow's Engineers EEP Robotics Competition

Target Group: Years 8 – 10 **Numbers:** 6–10
Duration: 4– 8 Weeks

A national competition based on Lego Mindstorms EV3 robots in which teams are required to customise and programme a robot to perform a series of challenges on competition day. Accompanied by full teacher training and loan of two full robot kits to the school.

Code Academy

Target Group: Years 6 – 10 **Numbers:** Class
Duration: 8– 12 Weeks

Sentinus has established a Code Academy for young people up to the age of 14 which aims to help teachers and young people engage in computer programming activity and enhance digital skills.

Schools are encouraged to set up a Code Club for which Sentinus offers support by providing monthly practical coding tutorials for teachers and pupils, ideas for practical coding activities and support to help develop coding skills.

Java Processing

Target Group: Years 8 – 10 **Numbers:** 30
Duration: Half Day – Full Day

Our JAVA processing workshop joins the world of art and coding, allowing Key Stage 3 students to learn programming fundamentals within a visual context. Pupils' creativity will be put to the test as they are tasked to create onscreen graphics. They will be taken through the process of building an image on screen and introducing a range of features, colours and effects. Ultimately, students will reach the point where they create a simple on screen game.

What They Said

Foundation STEM Roadshow

"I just want to thank you for Monday's sessions in Our Lady Queen of Peace. The teachers said you were fantastic and the ideas you gave them were great! The kids loved it!"

Aoibhinn Ryan, Teacher
Our Lady Queen of Peace Primary School

BBC MicroBit Workshop

"The Sentinus trainer was amazing, very knowledgeable and excellent delivery of a very innovative programme. I would definitely recommend this workshop to others and would definitely run it again in our school. Thanks a million for an amazing day for our Year 8 pupils.."

Nicola Ward, HoD ICT
Ballyclare High School

Primary Teacher Professional Learning

"Many thanks again for leading such an inspirational workshop. Probably the best professional development session we have had in a very long time."

Jackie Wallace, Principal
Stranmillis Primary School

Team R&D

"The scheme has confirmed our intentions to continue our study of engineering, and I am delighted to say that I will be applying for Electrical & Information Engineering at Imperial College London, having gained the confidence to do so through taking part in the Sentinus Team R&D scheme. Thank you also for the opportunity to attend the Big Bang Fair Northern Ireland. We thoroughly enjoyed the opportunity to share our project with others and receive feedback from an excellent panel of judges.

Stuart McDowell & Joel Murphy, Students
Ballymena Academy

Summer Camps

"Both my girls had a wonderful week on your summer camp at Queen's University. Despite the early start and rush hour travelling from and to Newtownards, they were both buzzing every evening about all they had done that day. I would 100% send them to other Sentinus run events. The girls had only good things to say about the leaders, their kindness, engagement and knowledge."

Janine Martin
Parent



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