

STEM Cymru 2

Engineering Education Scheme Wales



IET The Institution of
Engineering and Technology



Cronfa Gymdeithasol Ewrop
European Social Fund



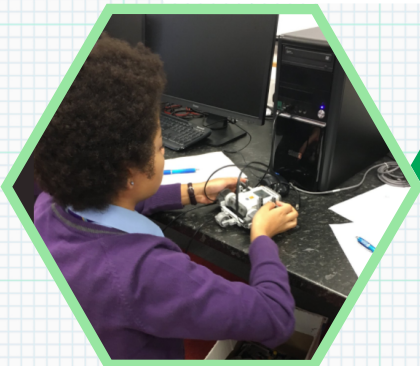
Who are we?

EESW is an independent registered charity that aims to inspire and motivate young people aged 8 to 19 to choose careers in Science, Technology, Engineering and Mathematics (**STEM**).

Our activities include the **EESW Project, Headstart Cymru, Girls into STEM, i2E, F1 in Schools and Jaguar 2D.**

EESW is part funded by the European Social Fund to run the **STEM Cymru 2** project within the West, North Wales and Valleys area.

We also receive funding from other sources to provide some activities to schools in East Wales.



Contact Us

to find out more about how you can get involved with EESW/STEM Cymru activities.

www.stemcymru.org.uk

info@stemcymru.org.uk

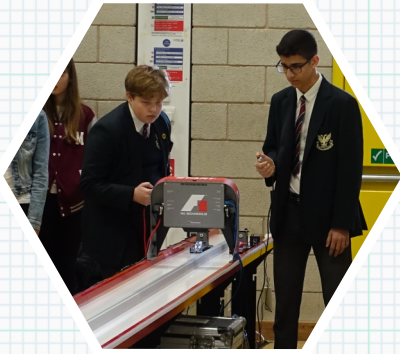
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You can also find us on social media.



F1 in Schools™ - Years 7 to 13



The **F1 in Schools** competition involves teams of students designing and manufacturing CO₂-powered model F1 racing cars using sophisticated computer aided design software and computer aided manufacturing techniques (CAD/CAM).

The **F1 in Schools** competition is split into 3 classes: **Entry, Development and Professional**. Teams are assessed on the speed of the car, engineering design, development, promotional materials, pit displays and verbal presentation.

The winners of the Welsh Regional Finals are invited to compete at the UK National Finals with the opportunity to represent Wales at the World Finals.



The challenge inspires students to develop their **STEM** skills and learn about physics, aerodynamics, design, manufacture, sponsorship and leadership/teamwork and apply them in a practical, imaginative, competitive and exciting way.

In addition to running the National competition, we also offer the opportunity for whole classes and year groups to participate in competitions in school.



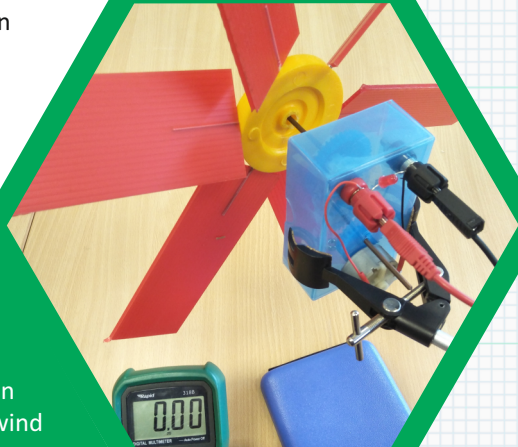


- Years 7 to 10

Introduction to Engineering (i2E) is a series of workshops designed to stimulate the interest of young people in **STEM** subjects by delivering an activity set in an enjoyable and real context.

ENERGY QUEST

This hands-on workshop challenges pupils to build a solar powered car, collect data on how their car performs when charged to different voltages and then plot a graph to predict the voltage required for their design to reach a set target.

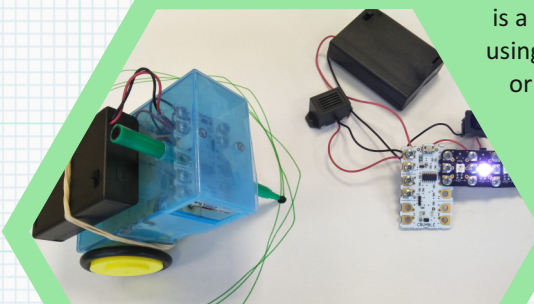


WIND TURBINES

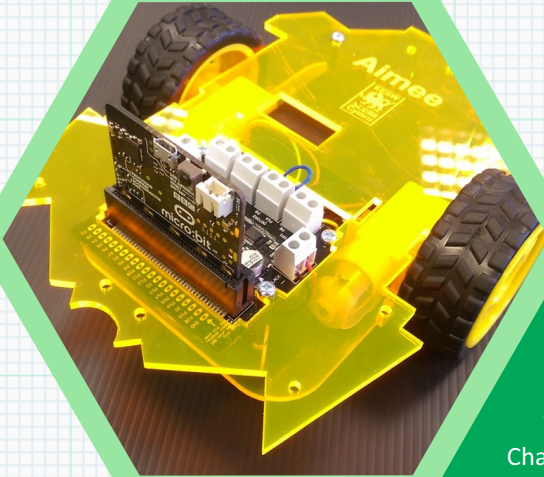
An energy themed workshop in which students build a working wind turbine. Turbines are tested to measure the voltage produced and designs adjusted to improve the output in an attempt to create the wind turbine with the most efficient energy output.

CRUMBLE CONTROLLER

Students are guided through a series of challenges to create circuits with LEDs, buzzers and switches and program them using a Crumble micro controller. This is a simple introduction to programming using a 'Scratch' style editor aimed at KS2 or lower KS3. Students complete the workshop by programming 'Drawbots' to create patterns.



**Tomorrow's
Engineers**



BBC MICROBIT

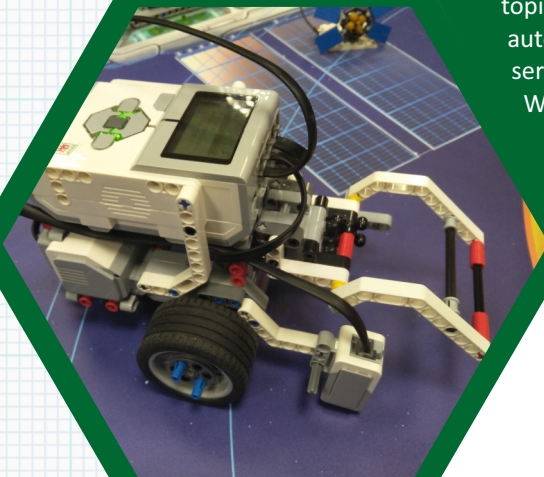
Students are guided through a series of challenges where they write code using Javascript or Python to move a Microbit car through a series of tasks. Pupils then code a transmitter and receiver, turning their car into a remote control vehicle with which they can compete with one another and adjust their code throughout to improve their vehicle.

TOMORROW'S ENGINEERS ROBOTICS CHALLENGE

The Tomorrows Engineers Robotics Challenge is a team-based programme for 11–14 year olds. Students work to build and program a LEGO EV3 robot to complete a series of short aviation themed missions. Teams will also present a solution to a contemporary engineering problem and receive feedback on their work from the engineering community.

FIRST LEGO LEAGUE

The FIRST LEGO League is a global science and technology challenge for teams of up to ten students aged 9-16. Students work together to explore a given topic and to design, build and program an autonomous LEGO® EV3 robot to solve a series of missions. Winning teams from Wales have the opportunity to attend the European and International Championships.



Girls into STEM

- Years 8 & 9



Our **Girls into STEM** initiative is a popular programme of events aimed at encouraging female pupils to take an active interest in **STEM** subjects prior to their GCSE choices.

Visits are arranged for groups of 8 to 45 pupils to a company or university department.

Programmes include:

- An introduction to the company/organisation
 - A site tour
- Practical hands-on activities
- Inspiring talks by role models in **STEM**

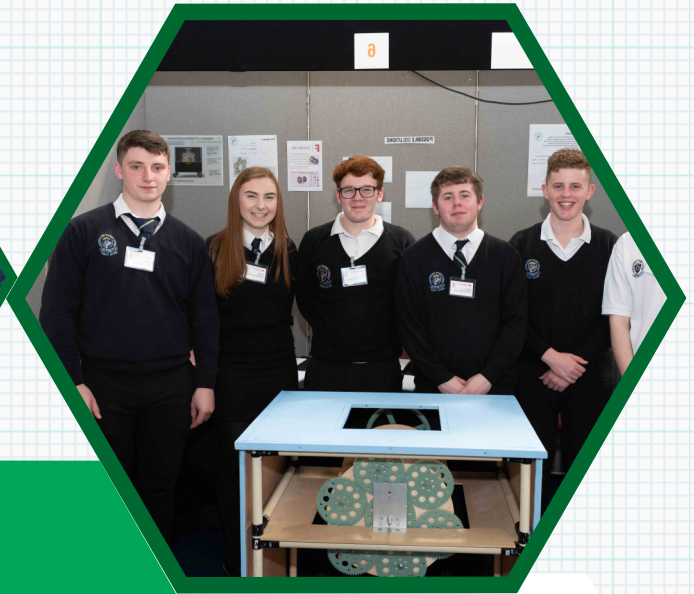
Visits are very beneficial for the pupils as they gain an insight into how the company operates, experience what goes on there and develop an appreciation for the different working environments that exist.



Companies that currently host visits include Ford Engine Plant, Wafer Fab, Zodiac Aerospace, Viridor & Sony UK Tec.

University visits include Aberystwyth University, Bangor University School of Ocean Sciences, University of Wales Trinity St David & Glyndwr University.

EESW Project - Year 12



The **EESW Project** encourages young people to consider a career in **STEM** by giving students a positive experience working with professional engineers in an industrial setting.

A link company sets a project brief related to a real problem within the company for a team of up to eight Year 12 students.

Students develop a range of skills and can apply for a Gold CREST Award. They can also use their EESW Project towards their Welsh Bacallaureate and could become the next EESW Student of the Year.

Students attend a **welcome event** in September/October, research and design their solution, attend a **workshop** in December and submit a written report before Easter.

Teams then attend an **Awards and Presentation Day** in North or South Wales to display their work and give a presentation to a panel of assessors.

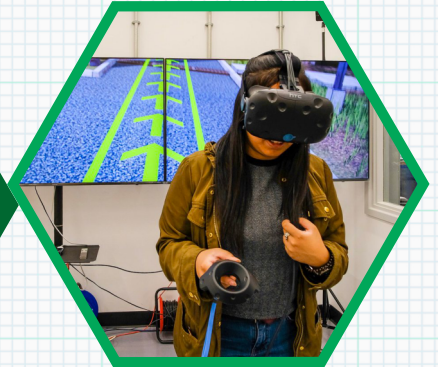


Headstart Cymru - Year 12

Headstart Cymru

residential courses give Year 12 students the opportunity to spend time at an Engineering, Product Design or Computing Department at **University** prior to submitting their UCAS application.

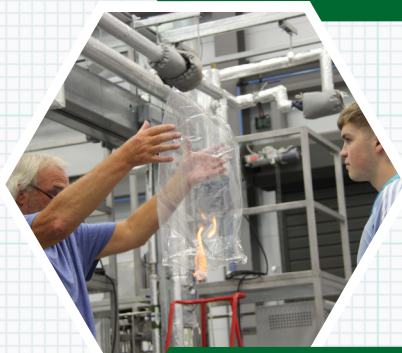
Students stay in University accommodation, tour the campus with undergraduates and attend lecture-style and practical sessions.



Courses give pupils an authentic experience of University life. Evening activities are arranged to give students an opportunity to socialise with students with similar interests.

Events are held in June, July & September, and costs £130 which includes all meals and accommodation.

However, we have a limited number of funded places available each year.



Contact us for more information on this year's courses.

Benefits

CYMHWYSTER
BAGLORIAETH | WELSH
CYMRU | BACCALAUREATE
QUALIFICATION

The **EESW Project** can be used to gain part of the **WJEC Advanced Welsh Baccalaureate**.

It is an approved enterprise brief for the **Enterprise and Employability Challenge** of the Skills Challenge Certificate, however there is a maximum of 6 members per team.



Our activities provide schools with the opportunity to develop and refine their pupils' skills set out in the Literacy and Numeracy Framework (LNF) in a practical and engaging way.

For more information on how the LNF is embedded in our activities please visit our website.

*"Projects such as this provide us with the opportunity to continue our support of young people and their contact with **STEM** subjects and jobs/careers."*

CREST Awards

CREST is a national award scheme for project work in science, engineering and technology, coordinated by the British Science Association throughout the UK.

Students participating in the **EESW Project** will have the opportunity to gain a CREST award at Gold or Silver level, whilst **i2E** and **F1 in Schools** students can gain Silver, Bronze or Discovery level.



Primary Schools - Years 2 to 6



Jaguar Primary School Challenge

The Jaguar 2D Challenge is a chance to inspire young minds to become engineers by designing and manufacturing the fastest car possible.

This **STEM** competition is open to pupils aged 6-11 years old who, in teams of four, use CAD software and equipment to design an aerodynamic racing car. They will use their research and design skills to produce a portfolio, enriching their learning.

Schools are able to enter teams for the North or South Wales regional finals where they will compete with their cars in the ultimate test of speed.

Winning teams are invited to the National Finals to compete against other UK countries.

To further promote **STEM** learning, we also offer in-school competitions to accommodate larger groups of pupils.



FIRST LEGO League Jr.

The FIRST LEGO League Jr. is an exciting **STEM** programme for 6-9 year olds. Each year a theme relevant to the world around them is chosen as a focus for the children's work.

Teams research the topic, displaying their ideas on a 'Show Me Poster' and build a moving model to help communicate their ideas.



STEM Cymru 2

Cynllun Addysg Peirianeg Cymru



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European Social Fund



Pwy ydym ni?

Mae Cynllun Addysg Beirianeg Cymru (EESW) yn elusen gofrestredig annibynnol sy'n anelu at ysbrydoli pobl ifanc rhwng 8 a 19 oed i ddewis gyrfaedd ym maes Gwyddoniaeth, Technoleg, Peirianeg a Mathemateg (**STEM**).

Mae ein gweithgareddau'n cynnwys **Prosiect EESW, Headstart Cymru, Denu Merched i Faes STEM, i2E, F1 mewn Ysgolion a Jaguar 2D.**

Mae cynllun EESW yn cael ei ariannu'n rhannol gan Gronfa Gymdeithasol Ewrop i weithredu prosiect **STEM Cymru 2** yn y Gorllewin, y Gogledd a'r Cymoedd.

Rydym hefyd yn derbyn cyllid o ffynonellau eraill i ddarparu gweithgareddau i ysgolion yn Nwyrain Cymru.



Cysylltwch â ni

i gael rhagor o wybodaeth am sut y gallwch gymryd rhan yng ngweithgareddau EESW/STEM Cymru.

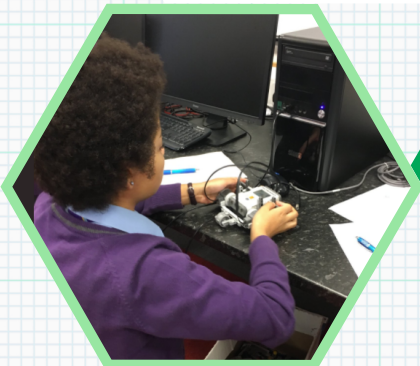
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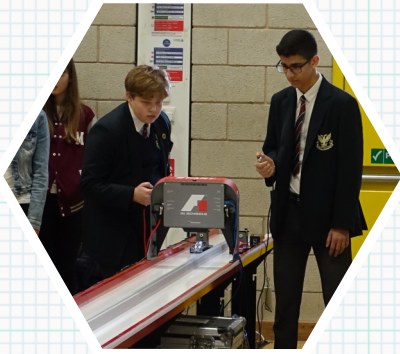
Ffacs: 01656 662402

Gallwch ddod o hyd i ni ar y cyfryngau cymdeithasol hefyd.



F1 in Schools™

- Blynyddoedd 7 i 13



Yn y gystadleuaeth **F1 in Schools**, mae timau o fyfyrwyr yn dylunio ac yn cynhyrchu ceir rasio F1 model sy'n rhedeg ar CO₂, gan ddefnyddio meddalwedd dylunio gyda chymorth cyfrifiadur soffistigedig a thechnegau cynhyrchu gyda chymorth cyfrifiadur.

Mae'r gystadleuaeth **F1 in Schools** wedi'i rhannu'n 3 dosbarth: **Entry, Development and Professional**. Mae'r timau'n cael eu hasesu ar sail cyflymder y car, dylunio peirianeg, datblygu, deunyddiau hyrwyddo, arddangosfeydd ar gyfer y modur y chyflwyniad llafar.

Gwahoddir enillwyr Rownd Derfynol Ranbarthol Cymru i gystadlu yn Rownd Derfynol Genedlaethol y DU a byddant yn cael cyfle i gynrychioli Cymru yn Rownd Derfynol y Byd.



Mae'r her yn ysbrydoli myfyrwyr i ddatblygu eu sgiliau **STEM** a dysgu am ffiseg, aerodynameg, dylunio, cynhyrchu, nawdd ac arweinyddiaeth/gwaith tîm, a'u defnyddio mewn ffordd ymarferol, ddychmygus, gystaddeuol a chyffrous.

Yn ogystal â chynnal y gystadleuaeth genedlaethol, rydym yn cynnig cyfle i grwpiau dosbarth cyfan a blwyddyn gyfan gymryd rhan mewn cystadlaethau yn yr ysgol.



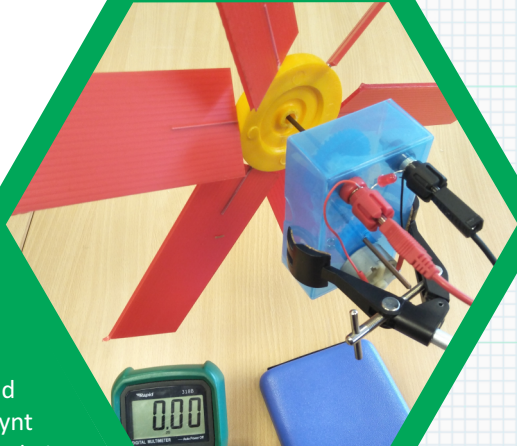


- Blynyddoedd 7 i 10

Mae Cyflwyniad i Beirianeg (**i2E**) yn gyfres o weithdai sydd â'r nod o ennyn diddordeb pobl ifanc mewn pynciau **STEM** drwy ddarparu gweithgaredd mewn cyd-destun difyr go iawn.

“ENERGY QUEST”

Mae'r gweithdy ymarferol hwn yn herio disgyblion i adeiladu car sy'n rhedeg ar ynni'r haul, casglu data ynghylch perfformiad eu car pan fydd wedi'i wefru ar wahanol folteddau, a llunio graff i ragweld y foltedd sydd ei angen er mwyn i'w dyluniad gyrraedd targed a bennwyd.

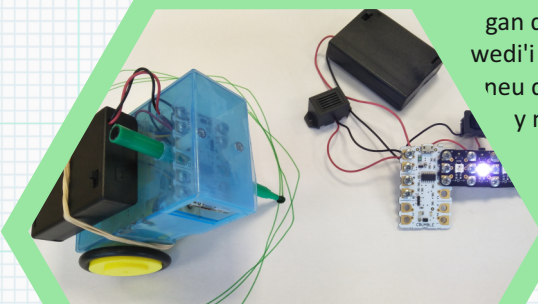


TYRBINAU GWYNT

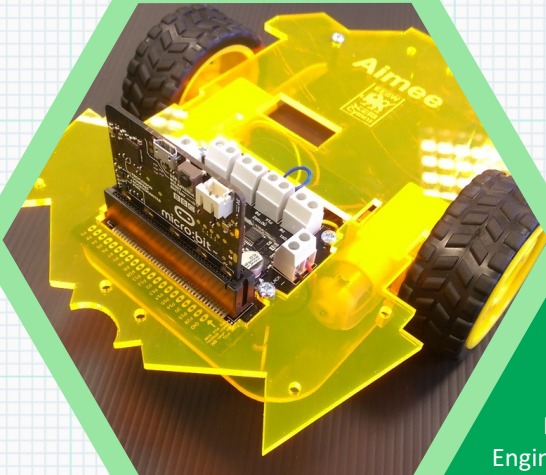
Gweithdy â thema ynni lle bydd myfyrwyr yn adeiladu tyrbिन gwynt sy'n gweithio. Mae tyrbinau yn cael ei profi i fesur y foltedd a gynhyrchwyd a'r dyluniadau wedi'u haddasu i wella'r allbwn mewn ymgais i greu'r tyrbिन gwynt â'r allbwn ynni mwyaf effeithlon.

RHEOLYDD CRUMBLE

Caiff myfyrwyr eu harwain drwy gyfres o heriau i greu cylchedau â goleuadau LED, seinwyr a switshys, a'u rhaglennu gan ddefnyddio microreolydd Crumble. Dyma gyflwyniad syml i raglennu gan ddefnyddio golygydd 'Scratch', sydd wedi'i fwriadu ar gyfer Cyfnod Allweddol 2 neu ddechrau Cyfnod Allweddol 3. Bydd y myfyrwyr yn cwblhau'r gweithdy drwy raglennu 'Drawbots' i greu patrymau.



**Tomorrow's
Engineers**



HER ROBOTEG "TOMORROW'S ENGINEERS"

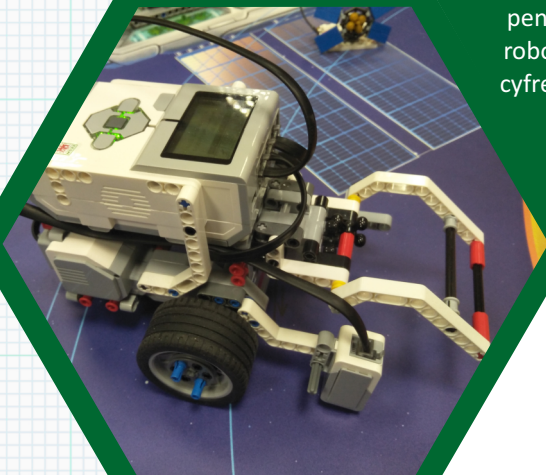
Mae Her Roboteg gan "Tomorrow's Engineers" yn rhaglen i dimau rhwng 11 a 14 oed. Bydd y myfyrwyr yn gweithio i adeiladu a rhaglennu robot LEGO EV3 i gwblhau cyfres o dasgau byr â thema hedfan. Hefyd, bydd y timau'n cyflwyno ateb i broblem beirianeg gyfoes ac yn cael adborth ar eu gwaith gan y gymuned beirianeg.

BBC MICROBIT

Bydd myfyrwyr yn cael eu harwain drwy gyfres o heriau lle byddant yn ysgrifennu cod gan ddefnyddio Javascript neu Python i symud car Microbit drwy gyfres o dasgau. Yna, bydd y disgyblion yn codio trosglwyddydd a derbynnydd, gan droi eu car yn gerbyd a reolir o bell y gallant ei ddefnyddio i gystadlu â'i gilydd, ac yn addasu eu cod drwy gydol y dasg i wella eu cerbyd.

FIRST LEGO LEAGUE

Mae'r Gyngwraig Lego yn her fyd-eang ym maes gwyddoniaeth a thechnoleg ar gyfer timau o hyd at 10 myfyriwr rhwng 9 ac 16 oed. Bydd y myfyrwyr yn cydweithio i ymchwilio i bwnc penodol a dylunio, adeiladu a rhaglennu robot LEGO® EV3 awtonomaidd i ddatrys cyfres o dasgau. Bydd y timau buddugol o Gymru yn cael cyfle i fynd i'r Pencampwriaethau Ewropeaidd a Rhyngwladol.




**FIRST
LEGO
LEAGUE**

Denu Merched i Faes STEM - Blynyddoedd 8 a 9



Mae ein menter **Denu Merched i Faes STEM** yn rhaglen boblogaidd o ddiwyddiadau sy'n ceisio annog disgyblion benywaidd i ymddiddori'n ymarferol pynciau **STEM** cyn gwneud eu dewisiadau TGAU.

Trefnir ymweliadau â chwmni neu adran o brifysgol ar gyfer grwpiau sy'n cynnwys rhwng 8 a 45 o ddisgyblion.

Mae'r rhaglenni yn cynnwys:

- Cyflwyniad i'r cwmni/sefydliad
 - Taith o amgylch y safle
 - Gweithgareddau ymarferol
- Sgyrsiau ysbrydoledig gan fodolau rôl ym maes **STEM**

Mae'r ymweliadau'n fuddiol iawn i'r disgyblion gan y byddant yn cael cipolwg ar sut y mae'r cwmni'n gweithredu, yn profi'r hyn sy'n digwydd yno ac yn datblygu gwerthfawrogiad o'r gwahanol amgylcheddau gwaith sy'n bodoli.

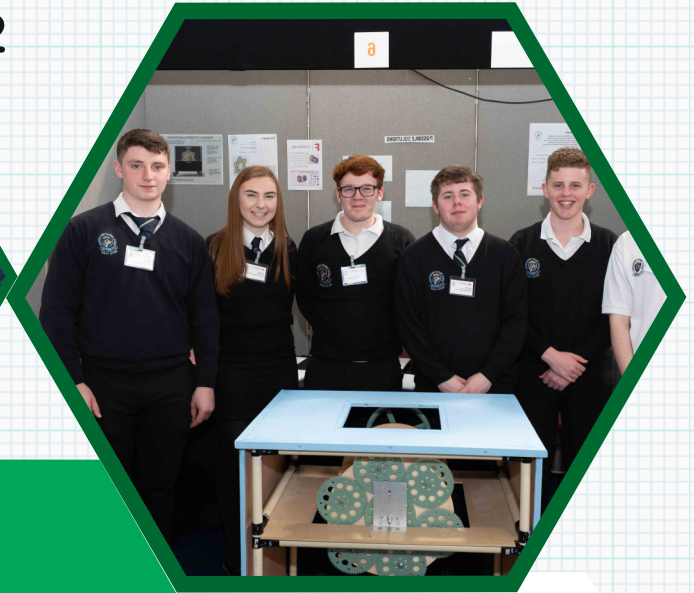


Ymhlith y cwmnïau sy'n cynnal ymweliadau ar hyn o bryd y mae gwaith peiriannau Ford, Wafer Fab, Zodiac Aerospace, Viridor a Sony UK Tec.

Mae'r ymweliadau â phrifysgolion yn cynnwys Prifysgol Aberystwyth, Ysgol Gwyddorau Eigion Prifysgol Bangor, Prifysgol Cymru y Drindod Dewi Sant a Phrifysgol Glyndŵr.



Prosiect EESW - Blwyddyn 12



Mae **Prosiect EESW** yn annog pobl ifanc i ystyried gyrfa ym maes STEM drwy roi profiad cadarnhaol i fyfyrwyr o weithio gyda pheirianwyr profesiynol mewn diwydiant.

Bydd cwmni cyswllt yn pennu briff prosiect sy'n ymwneud â phroblem go iawn yn y cwmni ar gyfer tîm o hyd at wyth myfyriwr Blwyddyn 12.

Bydd y myfyrwyr yn datblygu amryw o sgiliau a gallant ymgeisio am Wobr CREST Aur. Hefyd, gallant ddefnyddio Prosiect EESW tuag at eu cymhwyster Bagloriaeth Cymru a gallen nhw fod yn Fyfyriwr y Flwyddyn nesaf EESW.



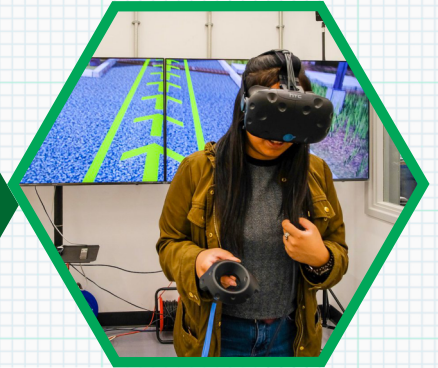
Bydd y myfyrwyr yn mynychu **digwyddiad croesawu** ym mis Medi/Hydref, yn ymchwilio i'w datrysiaid ac yn ei ddylunio, yn mynychu **gweithdy** ym mis Rhagfyr ac yn cyflwyno adroddiad ysgrifenedig cyn y Pasg.

Yna bydd y timau'n mynychu **Diwrnod Gwobrau a Chyflwyniadau** yn y Gogledd neu'r De i arddangos eu gwaith a rhoi cyflwyniad i banel o aseswyr.

Headstart Cymru - Blwyddyn 12

Mae cyrsiau preswyl **Headstart Cymru** yn cynnig cyfle i fyfyrwyr Blwyddyn 12 dreulio amser mewn Adran Peirianeg, Dylunio Cynnyrch neu Gyfrifiadura mewn **Prifysgol** cyn cyflwyno eu cais i UCAS.

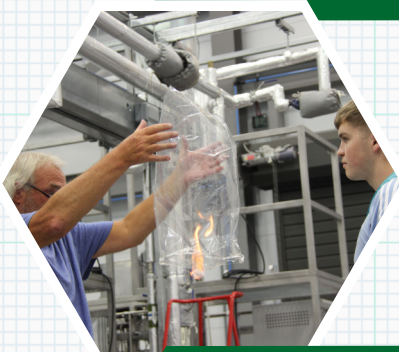
Gall y myfyrwyr aros yn llety'r Brifysgol, mynd ar daith o amgylch y campws gydag israddedigion a mynychu sesiynau ar ffurf darlith a sesiynau ymarferol.



Bydd y cyrsiau'n cynnig profiad go iawn o fywyd Prifysgol i'r disgyblion. Trefnir gweithgareddau gyda'r nos i roi cyfle i'r myfyrwyr gymdeithasu gyda myfyrwyr sydd â diddordebau tebyg.

Cynhelir y digwyddiadau ym mis Mehefin, Gorffennaf a Medi, ac maent yn costio £130, sy'n cynnwys yr holl brydau bwyd a llety. Fodd bynnag, dim ond hyn a hyn o leoedd wedi'u hariannu sydd ar gael bob blwyddyn.

Cysylltwch â ni i gael rhagor o wybodaeth am y cyrsiau eleni.



Buddion

CYMHWYSTER
BAGLORIAETH | WELSH
CYMRU | BACCALAUREATE
QUALIFICATION

Gellir defnyddio **Prosiect EESW** i ennill rhan o **Fagloriaeth Uwch Cymru CBAC**.

Mae'n friff menter a gymeradwywyd ar gyfer **Her Menter a Chyflogadwyedd y Dystysgrif Her Sgiliau**.

Fodd bynnag, mae uchafswm o 6 aelod fesul tîm.



Mae ein gweithgareddau'n cynnig cyfle i ysgolion ddatblygu a mireinio sgiliau eu disgyblion a amlinellir yn y Fframwaith Llythrennedd a Rhifedd mewn ffordd ymarferol a diddorol.

I gael rhagor o wybodaeth am sut y mae'r Fframwaith wedi'i ymwreiddio yn ein gweithgareddau, ewch i'n gwefan.

*"Mae prosiectau fel hyn yn cynnig cyfle inni barhau i gefnogi pobl ifanc a'u cysylltiad â phynciau **STEM** a swyddi/gyrfaedd."*



Gwobrau CREST

Cynllun gwobrau cenedlaethol yw **CREST** ar gyfer gwaith prosiect ym maes gwyddoniaeth, peirianeg a thechnoleg, sy'n cael ei gydgylltu gan Gymdeithas Wyddoniaeth Prydain ledled y DU.

Bydd myfyrwyr sy'n cymryd rhan ym **Mhrosiect EESW** yn cael cyfle i ennill gwobr CREST ar lefel

Aur neu Arian, a gall myfyrwyr sy'n dilyn cynlluniau **i2E** a **F1 mewn Ysgolion** ennill gwobr ar lefel Arian, Efydd neu Ddarganfod.



Ysgolion Cynradd - Blynyddoedd 2 i 6



Her Ysgolion Cynradd Jaguar

Mae Her 2D Jaguar yn gyfle i ysbrydoli meddyliau ifanc i fod yn beirianwyr drwy dylunio a chynhyrchu'r car cyflymaf posibl. Mae'r gystadleuaeth **STEM** hon yn agored i ddisgyblion rhwng 6 ac 11 oed a fydd, mewn timau o bedwar, yn defnyddio meddalwedd ac offer dylunio gyda chymorth cyfrifiaduwr i ddylunio car rasio aerodynameg. Byddant yn defnyddio eu sgiliau ymchwilio a dylunio i greu portffolio a fydd yn cyfoethogi eu dysgu.

Gall ysgolion gynnig timau ar gyfer rownd derfynol ranbarthol y Gogledd neu'r De, lle byddant yn cystadlu gyda'u ceir yn y prawf cyflymder eithaf.

Gwahoddir y timau buddugol i'r rownd derfynol genedlaethol i gystadlu yn erbyn gwledydd eraill y DU.

I hyrwyddo dysgu ym maes **STEM** ymhellach, rydym yn cynnig cystadlaethau mewn ysgolion ar gyfer grwpiau mwy o ddisgyblion hefyd.



JAGUAR

PRIMARY SCHOOL CHALLENGE



FIRST LEGO League Jr.

Mae FIRST LEGO League Jr. yn rhaglen **STEM** gyffrous i blant rhwng 6 a 9 oed. Bob blwyddyn, dewisir thema sy'n berthnasol i'r byd o'u cwmpas yn ganolbwynt ar gyfer gwaith y plant.

Bydd y timau'n ymchwilio i'r pwnc, gan arddangos eu syniadau ar boster, ac yn adeiladu model sy'n symud i helpu i gyfleu eu syniadau.