Science Foundation Ireland sfi For what's next

University College Dublin
School of Education
School of Mathematics and Statistics

UCD/SFI Shared Learning Day

Girls in DEIS Schools: Changing Attitudes / Impacting Futures in STEM

11th December 2019 | O'Brien Centre for Science

edistem@ucd.ie @editstem

PDST Professional Development Service for Teachers | An tSeirbhís um Fhorbairt Ghairmiúil do Mhúinteoirí

An Roinn Oideachais agus Scileanna Department of Education and Skills

JuniorCYCLE for teachers

Laois Education Centre Ionad Oideachais Laoise

Roinn Cumarsáide, Gníomhaithe ar son na hAeráide & Comhshaoil Department of Communications, Climate Action & Environment

SUSTAINABLE DEVELOPMENT GOALS

WITS Women in Technology and Science

edu

wriggle your digital schoolbag

I.E.A.

PhilosophyIreland

the thinker's midwife

ubuntu network

PLAYTOWN TULLAMORE

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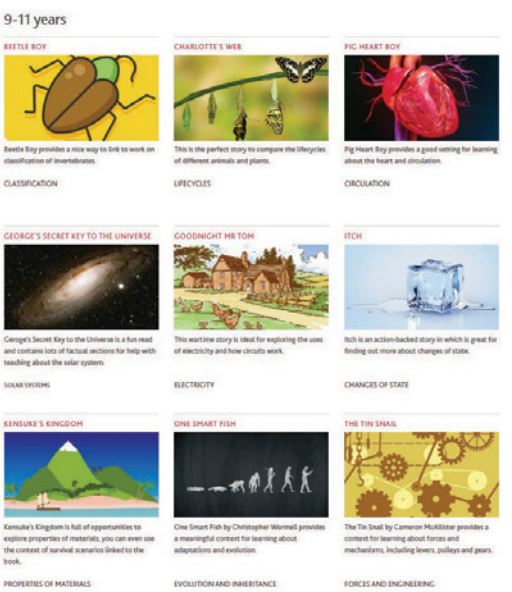
TEACHING SCIENCE THROUGH STORIES



https://www.stem.org.uk/teaching-science-through-stories

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GIRLS ROCK STEM

UCD DUBLIN University College Dublin
School of Education
School of Mathematics and Statistics

UCD/SFI Shared Learning Day Programme

11th December 2019 | O'Brien Centre for Science

Girls in DEIS Schools: Changing Attitudes /Impacting Futures in STEM

Introduction & Overview of the Day **11.30**

Professor Judith Harford

VP for Equality, Diversity & Inclusion in the CoSSL, UCD

Welcome **11.40**

Ms Sabina Higgins

Science at UCD **11.50**

Professor Joe Carthy

College Principal and Dean of Science, UCD

The Why and the Why Not of Physics **12.00**

Dr Sharon Shannon

School of Physics, UCD

Understanding the Mysteries of the Brain **12.10**

Professor Keith Murphy

School of Biomolecular and Biomedical Science, UCD

SFI Study Initial Findings & Next Steps **12.20**

Rachel Farrell, Marelle Rice, Karen Maye and Aoibhinn Ni Shuilleabhain

School of Education, UCD

Tour of Concourse to view Pupils' STEM Projects **12.30**

Lunch **1.00**

Please visit the following exhibitions:

SchooVR Virtual Reality with Mark Baldwin; Microbit demonstation with Brendan Cawley and Augmented Reality Books with Anna Carmody of Little Red Design Studio

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SHARED LEARNING DAY - PRESENTERS

Sabina Coyne Higgins

Sabina Coyne, now Sabina Coyne Higgins, was born in Cloonrane on the Galway/Mayo border and went to school in Ballindine and Claremorris, Co. Mayo. She was the sixth of seven children of John and Mary (nee Kilkenny) Coyne. Sabina moved to Dublin where she worked in the Land Commission. She studied Speech and Stage Craft at the Brendan Smith Academy. When Deirdre O'Connell came from the Actor's Studio in New York and founded the Dublin Stanislavsky Studio Drama School in 1963, Sabina was one of her first students – she was later Deirdre's bridesmaid when Deirdre married Luke Kelly of the Dubliners. In 1967, they founded Dublin Focus Theatre with Tom Hickey, Timmy McDonald, Declan & Mary Elizabeth Burke Kennedy, Dick Callanan, Joan Bergin and others. Sabina was prominent in the public performances of the Stanislavski Improvisation Theatre and later the Focus Improvisational Theatre. Focus productions were modern classics from around the world – Ibsen, Strindberg, Chekhov, Anouilh, Camus, Beckett, Hellman, Sorayan, Millar, and T. Williams etc. Sabina met Michael D. Higgins in 1969 at a party in Dublin, in women's journalist Mary Kenny's home. In 1974 they were married in Dublin's Haddington Road Church. Sabina moved to Galway. There, in addition to working as a partner with Michael D. in every campaign and in public life for over thirty years, she maintained her involvement with Theatre and Community Arts, and with Womens' Groups. Sabina was also very active in community initiatives in Galway and in particular in education. She was very involved in the setting up of Parents' Councils on a local and national level to promote parents as partners in education. She was chairperson for a time of the Parent's Council of the Jesuit Secondary School. Sabina has a BA in Arts and an MA in Theatre from NUI Galway. Sabina and President Higgins have four children, one daughter, Alice Mary, and three sons, John, Michael Edward and Daniel.

Professor Joe Carthy

Professor Joe Carthy is College Principal and Dean of Science at UCD. He served two terms as a member of UCD's Governing Authority. He was the founding Director of the UCD Centre for Cybersecurity and Cybercrime Investigation which has established strong links with international law enforcement agencies in more than 60 countries as well as Europol, Interpol and theUNODC. He was a member of the government's Internet Content Governance Advisory Group in 2013. Professor Carthy has a strong record in winning funding for research. He has also supervised/co-supervised 34 Research students to completion.

Dr Sharon Shannon

Dr Sharon Shannon holds a BSc in Physics and Chemistry and a PhD from University College Dublin. Her PhD research focused on molecular magnetism and the assembly of these switchable molecules into nanostructures. She is involved in the UCD Science Student Recruitment Committee and additionally is also the Co-Chair for the UCD Women@STEM Committee. She is dedicated to widening participation and equality, diversity and inclusion in STEM. Sharon has a strong track record of participating in outreach activities including delivering talks, practicals and demonstrations to students of all ages and members of the public. She now works in the UCD school of physics demonstrating experimental physics, lecturing on the UCD SEAM Access course and conducting a primary level outreach programme.

Professor Keith Murphy

Keith is Professor of Neuropharmacology and heads the Neurotherapeutics research group in UCD. He holds a BSc (Pharmacology and Mathematics) and a PhD (Neuropharmacology) from UCD where he has lectured for the last 20 years. His main goal as a teacher of Neuropharmacology, a biomedical research science, is to provide the structure that a student can build on to develop their mental capacities to be able to think like a scientist. His leadership abilities have been clearly recognised in UCD where he has served as Head of Subject for Pharmacology (2007-2011) and Head of the School of Biomolecular and Biomedical Science (2013-2016). In his research, Keith focuses on the function and diseases of the brain, especially depression, psychosis, addiction and multiple sclerosis. His research is developing new treatments to help to treat these brain diseases. Keith is also the Academic Director of the UCD Access to Science, Engineering, Agriculture and Medicine Programme.

PROJECT TEAM

Girls in DEIS Schools: Changing Attitudes/Impacting Futures in STEM

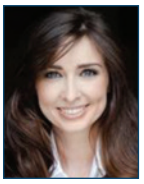
Principal Investigator - Professor Judith Harford

Judith is Professor of Education, Deputy Head of the School of Education and Vice Principal for Equality, Diversity and Inclusion in the College of Social Sciences and Law, UCD. She has published nationally and internationally in the areas of history of women's education, gender and educational leadership and teacher education policy. She is series editor for Peter Lang: Oxford (Re-Thinking Education Series) and Emerald Publishing (Teacher Preparation in National and Global Contexts Series). She has served on several committees and working groups of the Irish state Department of Education and Skills and the Teaching Council of Ireland and has acted as an international advisor to the Social Sciences and Humanities Research Council of Canada, the Nordic Council of Ministers and the Estonian Research Council. She is a Fellow of both the Royal Historical Society (London) and the Massachusetts Historical Society (USA) and an International Clinical Practice Fellow of the American Association of Teacher Educators. She is the Ireland Canada University Foundation Flaherty Visiting Professor, 2017-18 and a Fulbright Scholar in the Social Sciences, 2018-19. She has held visiting scholar appointments at Boston College and the University of Toronto.

Co-Principal Investigator - Rachel Farrell

Rachel is a Research Fellow in Democratic Pedagogical Partnerships in Initial Teacher Education (ITE) and is the Director of the Professional Master of Education (PME) at the School of Education, University College Dublin. Rachel is the lead investigator of the UCD evaluation of the effectiveness of ePortfolios for pedagogy and collaboration using the Microsoft Ecosystem in ITE and is a Co-Principal Investigator on a number of other projects including: Girls in DEIS Schools: Changing Attitudes /Impacting Futures in STEM", funded by Science Foundation Ireland and supported by the Professional Development Services for Teachers (PDST); Transitions in Mathematics project involving primary and post-primary mathematics teachers, funded by the DES; Readiness and Practice (RAP): Sounding out ITE Students' Readiness to Teach with Digital Technology, funded by SCoTENS and Virtual and Augmented Reality and Initial Teacher Education: Novelty of Game Changer?, funded by SCoTENS. Prior to moving to UCD in 2016, Rachel was the Deputy Director of the Professional Development Service for Teachers (PDST) which involved working closely with the Department of Education and Skills (DES) on the implementation of education policy in Ireland. Rachel's research is underpinned by practical experience gained over twenty years in teaching and curriculum development. At the heart of Rachel's work is her appreciation of the power of inquiry-based learning. Rachel co-founded the PDST Young Economist of the Year (YEOTY) national awards in 2014 and is currently chair of YEOTY working group in collaboration with the Irish Economic Association (IEA), the Irish Government Economic and Evaluation Service (IGEES), the Department of Communications, Climate Action and Environment Climate Change and the Central Bank of Ireland.

Co-Principal Investigator - Asst. Prof. Aoibhínn Ní Shúilleabháin



Aoibhinn is an Assistant Professor in the School of Mathematics & Statistics where she is director of the BSc. Science, Mathematics & Education programmes in the College of Science. Her research investigates issues in Mathematics Education, with particular focus on teacher education and the development of teacher pedagogical content knowledge. Lesson study, a Japanese model of teacher professional development, forms a large part of her research and she has been involved in a number of Irish-based and international lesson study projects. In 2018, she won a UCD Research Impact Award for her work on Lesson Study with Irish mathematics teachers. As a former post-primary teacher and graduate of Theoretical Physics, Aoibhinn is also interested in gender and socioeconomic equity issues within the teaching of STEM (science, technology, engineering and mathematics). Following on from her extensive experience as a science communicator on TV, radio and in print, she is also interested in research on public engagement in science and in 2017 won the SFI Outstanding Contribution to STEM Communication Award. Aoibhinn has published nationally and internationally on her research and plays an active role in a number of national and international networks. She is a member of the STEM Education Policy Review Group of the Department of Education & Skills and is also a member of the Project Maths Implementation Support Group (DES). She is a member of the Irish Mathematical Society Education sub-committee and the CERME (Congress of European Researchers in Mathematics Education) International Programme committee. She is also an executive committee member of the national WITS (Women in Technology and Science) group and is a member of Science Gallery Dublin's National Education Committee.

Project Manager & P4C Expert - Marelle Rice

Marelle has a relentless passion for education and philosophy and has spent well over a decade embedding philosophical inquiry into her teaching and learning environment. Having worked in the UK as Head of Religion, Philosophy and Ethics in both the state and independent sectors, she has also been active in teacher professional development and was a SAPERE accredited Philosophy for/with Children (P4C) teacher trainer in the UK for many years. Co-founder and Director of Philosophy Ireland and Director of The Thinker's Midwife, her work with the NCCA on the Philosophy Short Course brought her back to Ireland in 2017 and she wears a number of hats as she supports the development of Philosophical Inquiry and IBL in all areas of the Irish education system. She is a PME lecturer at UCD, and is Project Managing an SFI funded project; 'Girls in DEIS Schools: Changing Attitudes, Impacting Futures in STEM', which was shortlisted by the Teaching Council for their Teachers Inspire Award for Teacher Collaboration in September 2019. In her role as a JCT Associate, Marelle is responsible for the design and delivery of the Philosophy Short Course CPD. As a freelance consultant, Marelle works with a wide range of educational institutions and organisations to bring philosophy and P4C to a wide range of curricular areas at primary, post primary and third level.

Project Manager & Science Educator - Karen Maye

Karen has over 14 years' experience teaching in post-primary schools in the UK and Ireland and has worked as a lecturer, mentor and supervisor with UCD's Initial Teacher Education programmes since 2015. She is passionate about the importance of teacher collaboration and professional development in effecting positive change in education. She has held roles in the Irish Science Teacher Association and the National Induction Programme for Teachers where she was responsible for designing and delivering professional development to teachers both locally and nationally.

UCD PME Midlands Outreach Co-ordinator - Trisha McNeill

Trisha is an Assistant Principal in Killina Presentation Secondary School, Rahan, Co. Offaly. With over 20 years' experience teaching German and History to all levels in post-primary, Trisha leads many exciting initiatives in her school including positive wellbeing week. As a PDST MFL Associate, Trisha leads an innovative primary to post-primary language project with her TYs and St. Colman's National School. Trisha co-ordinates the outreach branch of the PME programme supporting professional placement supervisors in the Midlands region the Offaly cluster of schools involved in the Girls in STEM project.

Laois Communities of Practice Co-ordinator - Jim Enright

Jim is a professional placement tutor on the Professional Master of Education (PME) programme in UCD. Having previously worked as an ICT Advisor with NCTE (1999 – 2008) and Director of Laois Education Centre (2008 – 2018), Jim is currently working in a learning support capacity in Coláiste Choilm in Tullamore where he mentors student teachers on school placement. With a keen interest in STEM, inclusion and diversity Jim contributed to the development of a co-ordinator training tool for teachers of new comer students with English as an Additional Language (EAL) with the Northern Ireland Inclusion and Diversity Service. Jim has successfully led many regional STEM projects over the years and brings all of this expertise and experience to the co-ordination of the Laois cluster of schools involved in the Girls in STEM project.

Digital Technology Co-ordinator - Brendan Cawley

Brendan Cawley is an Assistant Principal, and engineering and technology teacher who is currently working as a Microsoft Learning Consultant and Learning Delivery Specialist. Brendan has a number of years' experience in supporting schools, Education Training Boards, Further Education and third level educators and leaders on their journey to enhance teaching, learning and assessment with technology. Brendan has recently set up his own education consultation, training and support service specialising in; Technology Enhanced Learning; Digital Technology for Education; Tailored CPD Support for Education; Office 365; Micro:Bit; STEM; digital Portfolios and CBAs.

Dedication

Gerry Connolly, former principal of Oaklands Community College in Edenderry, sadly passed away in September 2019 following a brave battle with illness. The Westmeath man moved to Oaklands in 2008 and was a much-loved principal, educator, friend and colleague to the students and staff there.

Gerry was a dear friend of the School of Education in UCD. He was a fantastic role model and mentor to the many student teachers that he facilitated on school placement. We miss you Gerry, but your legacy will live on.

Message from Ciara O'Donnell, National Director of the Professional Development Services for Teachers

The Professional Development Service for Teachers (PDST) are delighted to be involved in this innovative project directly concerned with the promotion and support of STEM education for girls. As an under-represented group in STEM in Ireland, we need efforts such as those being made here by the School of Education in UCD and Science Foundation Ireland, to develop and strengthen the interest and attitudes of young girls in primary and post-primary schools in STEM. Our contribution hopes to support the participating teachers in using innovative pedagogies which deepen emotional connection with STEM subjects and which raise awareness of women's past achievement in STEM as well as opportunities for future ones. I'd like to commend the schools who have opted to take part in this project and share their practice collaboratively today. After all it is together that we can all bring about a cultural change which promotes gender equality and which truly recognises that STEM disciplines are indeed for all !

Participating Schools where Professional Master of Education (PME) students are working collaboratively with their co-operating teachers to implement the initiative.

Sacred Heart School, Tullamore

St. Paul's Secondary School, Greenhills

Portlaoise College

Tullamore College

Coláiste Íosagáin, Portarlington

Presentation Primary School, Portarlington

Killina Presentation Secondary School, Co. Offaly

St. Colman's NS, Mucklagh

Hartstown Community School, Dublin

St. Tiernan's Community School, Balally

St. Mary's Edenderry

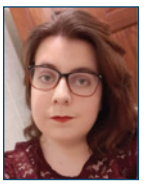
The Girls in STEM Community of Practice was nominated for the DCU/Teaching Council Teacher Inspire Award in October 2019

The Ubuntu Network actively promotes that Development Education be embedded into post-primary Initial Teacher Education (ITE) in Ireland - our goal is to support teacher educators and student teachers to engage with local and global development issues, to see how they are relevant to their subject areas and disciplines, and to understand the value that such perspectives bring to teaching.

UCD Professional Master of Education (PME) students leading the Girls in STEM initiative

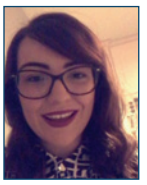
Frances Palmer

Frances is a teacher of History and English. Having completed her PME 1 placement in her alma mater, Oaklands Community College, Edenderry, Co. Offaly, Frances is currently on PME 2 placement in Killina Presentation Secondary School, Rahan, Co. Offaly. Frances is very interested in the Sustainable Development Goals and is currently completing her dissertation focussing on supports for teachers as they implement a whole school approach to well-being – SDG no. 3!



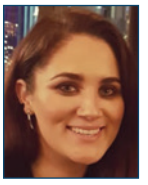
Adele Wilson

Adele Wilson is teaching Geography, Environmental Studies and C.S.P.E. in Portlaoise College. With a keen interest in the Sustainable Development Goals, Adele recently attended the WorldWise Global Schools continuing professional development for teachers and will cascade this learning back to the Girls in STEM team. Adele's PME dissertation will focus on active learning for an inclusive classroom – SDG no. 4!



Lisa Fleming

Lisa is a teacher of Junior Science, Biology and Agricultural Science. She completed her first placement of her PME in Coláiste Íosagáin in Portarlington, Co. Offaly. This year she is on PME2 placement in St. Mary's Seconday School in Edenderry, Co. Offaly. Her PME dissertation will focus on the transition from primary to post-primary with particular reference to science and girls' attitudes to STEM – SDG no. 5!



Conor McElduff

Conor is a teacher of Maths and Geography who completed his PME 1 placement in Mount Anville Secondary School, Dublin. Conor is currently on school placement in the Sacred Heart School, Tullamore, Co. Offaly where he is researching the use of Digital Technology including Virtual and Augmented Reality (AR and VR) for the teaching, learning and assessment of mathematics – SDG no. 4!

UCD School of Education
Scoil an Oideachais UCD

Sacred Heart School
Tullamore

Sacred Heart School

Daingean Rd., Tullamore, Co. Offaly

Teachers: Jacinta Gallagher (English and Geography) & Conor McElduff (Maths & Geography)

Students: Sarah Beatty, Molly Brennan, Hannah Cahill, Lusiana Caringi, Annamae Clear, Mary Colbert, Adele Donoghue, Melissa Dunne, Abbie Fisher, Sinead Flanagan, Mia Dolan Hilliard, Sunniva Horneck Johnston, Philippa Kelly, Fainche McNamee, Aoibhinn O'Meara, Meabh Rouse, Andrea Ryan & Eva Spollen

Project Title: Women in STEM throughout the ages; past, present and potential future 'STEMinists'. Our role models of the 21st century including past students of the SHS who are now working in the area of STEM and:

Valentina Tereshkova - is a member of the Russian State Duma, engineer, and former cosmonaut. She is the first and youngest woman to have flown in space with a solo mission on the Vostok 6 on June 16 1963.

Hedy Lamarr - was an Austrian-American actress and inventor who pioneered the technology that would one day form the basis for today's WiFi, GPS, and Bluetooth communication systems.

Elizabeth Blackwell - was the first woman in America to receive a medical degree, Elizabeth Blackwell championed the participation of women in the medical profession and ultimately opened her own medical college for women.

Elizabeth Magie - was an American game designer, writer and Georgist. She invented The Landlord's Game, the precursor to Monopoly, to illustrate teachings of the progressive era economist Henry George.

Hypathia - was a Hellenistic Neoplatonist philosopher, astronomer, and mathematician, who lived in Alexandria, Egypt, then part of the Eastern Roman Empire. She was a prominent thinker of the Neoplatonic school in Alexandria where she taught philosophy and astronomy.

Emilie Du Chatelet - was a French natural philosopher, mathematician, physicist, and author during the early 1730s until her untimely death due to childbirth in 1749.

Mary Cartwright - was a British mathematician. With J. E. Littlewood Cartwright was one of the first mathematicians to study what would later become known as chaos theory. She saw many solutions to a problem she was studying and this would later be seen as an example of the butterfly effect.

Marjorie Lee Browne - Born in Tennessee in 1914, Marjorie Lee Browne was a gifted mathematician and educator. In 1949, she became only the third African-American woman to earn a Ph.D. in her field. In 1960, Browne set up an electronic digital computer center at North Carolina College, one of the first of its kind at a minority college.

Past pupils of the Sacred Heart School who went on to careers in STEM:

- Ann-Marie Jennings - Medical Scientist
- Laura Maye - Computer Science Lecturer
- Oilbhe Lawlor - Scientist
- Hannah Prendervillie - Cancer researcher
- Lucy Prenderville - Nanoscientist
- Ciara McManamly - Pharmacist
- Orla McManamly - Actuary
- Emer McManamly - Veterinary Surgeon
- Catherine Graham - Engineer, Bord Na Mona
- Hannah Reilly - Engineer
- Ellen Norton - Actuary
- Anna Carmody - Educational Technologist – founder of littlereddesignstudio.com

St. Paul's Secondary School

Limekiln Lane, Greenhills, Dublin

Teachers: Claire Creggy (Science, Biology, Maths and Digital Technology), Darragh Patton, (English and History) and Keith Brett (Science and Maths)

Students: Niamh Hickey, Keelin Mooney, Signe Taguba and Hannah Norton

Project Title: "Women in STEM, the past, the present and the future"
Each student investigated a window of time focusing on how women are treated in the field of STEAM. They compiled all their thoughts and created a Sway presentation, a more comprehensive written piece to complement the presentation and a little poster with the key ideas illustrated.

Portlaoise College

Mountrath Rd, Clonroosk Little, Portlaoise, Co. Laois

Teachers: Adele Wilson (Geography and CSPE) and Patricia Cullen (Deputy Principal)

Students: Anastazja Bryszkowska, Grace Byrne, Bara Danielova, Nikoleta Drapakova, Caoimhe Kinfack Tetsowo, Erin Leonard, Evelyn Murphy, Divine Samuel, Sophia Stokes and Sorina Stratu.

Projects:

Ellen Churchill Semple – was an American geographer and the first female president of the Association of American Geographers. She contributed significantly to the early development of the discipline of geography in the United States, particularly studies of human geography. Semple always considered herself to be a scientist, and her Vassar course load was heavy in the natural and social sciences. "Geography for Semple," comments her biographer, professor emeritus of geography Harvey Flad, "was the perfect blend of science and sociology; it was where she felt the most at home, and where her talents really flourished." She also had interests in economics, history and languages.

Professor Anne Buttimer - was a noted scholar in the history and philosophy of geographical thought and practice and a leader in developments in human and cultural geography. She became Professor of Geography at UCD in 1991 and 'retired' in 2003 but Anne never stopped working on her projects. She was Ireland's preeminent geographer and accumulated a great many honours over her career, including becoming the first Irish President of the International Geographical Union (2000-2004). She had a lasting influence on Geography at UCD through her international contacts, generous spirit and abiding interest in the creation of academic communities.

Tullamore College

Riverside, Tullamore, Co. Offaly

Teachers: Michelle Griffin (Business & Accounting) and Sarah Foran (English)

Projects:

Dr Grainne Kirwan - is lecturer on the BSc (Hons) in Applied Psychology and MSc in Cyberpsychology. She is a member of the editorial board of the international journal Cyberpsychology, Behavior and Social Networking.
Students - Ashley Coyle, Lyla Kane Walsh, Amelie O'Connor

Dr Jocelyn Bell Burnell - is an astrophysicist from Northern Ireland who, as a postgraduate student, co-discovered the first radio pulsars in 1967. She was credited with "one of the most significant scientific achievements of the 20th century".
Students - Aoife Farrell, Eva McDowell

Dr Mae Jemison - is an American engineer, physician, and former NASA astronaut. She became the first black woman to travel in space when she served as a mission specialist aboard the Space Shuttle Endeavour.
Students - Caoimhe Geoghegan, Maeve Lally, Hannah Doyle

Dr Mary Seacole - was a British-Jamaican business woman and nurse who set up the "British Hotel" behind the lines during the Crimean War. She described this as "a mess-table and comfortable quarters for sick and convalescent officers", and provided succour for wounded servicemen on the battlefield.
Students - Sofia O'Connor, Katie Deverell

Dr Rosalind Franklin - was an English chemist and X-ray crystallographer whose work was central to the understanding of the molecular structures of DNA, RNA, viruses, coal, and graphite.
Students - Rochelle Alao, Aleska Luszczynska, Rachel Gorman, Diminka Debiak

TY Project: Women in Economics - Representing women who were airbrushed from the pages of economic history including: Mary Paley Marshall, Millicent Fawcett, Christina Romer, Claudia Reinhart, Irene Calvert, Dambisa Moyo, Harriet Martineau, Rosa Luxemburg, Carmen Reinhart, Joan Robinson, Anna Schwartz, Deirdre McCloskey, Elinor Olsrom and Janet Yelllen.
Students: Aoife Flynn, Molly Flynn, Mollie Mai Browne and Emma Fitzpatrick.

Professor Colin Scott, Vice President for Equality Diversity and Inclusion and Professor Judith Harford, Vice Principal for Equality Diversity and Inclusion pictured with Tullamore College teacher Michelle Griffin and her TY class of 2019 who received a special Science Foundation Ireland prize at the Young Economist of the Year award for their project entitled: "Representing Influential Women who were Airbrushed from the Narrative of Economic History".

School of Education
School of Mathematics & Statistics

Girls in DEIS Schools: Changing Att

edistem@ucd.ie

Background

Despite the advancements made by women in the employment sector and the academic success enjoyed by girls[1], women continue to be persistently underrepresented in the fields of science, technology, engineering, and maths (STEM). In Ireland, **women represent fewer than 25% of people working in jobs that use STEM skills**[2].

Research on gender and STEM tells us that in order for young women to pursue a career in STEM, **they must believe in the importance of STEM and believe in their ability to succeed in the field**[3]. Research conducted by Microsoft has revealed that most girls become interested in STEM at age 11, but their interest starts to wane by age 15.

Students in post-primary schools designated as disadvantaged (**DEIS**) are **particularly under-represented in STEM in Ireland** and are less likely to pursue STEM after post-primary school[4].

This project aims to develop and strengthen the interest and attitudes of young girls in schools designated as disadvantaged (DEIS) in STEM.

Working in STEM in Ireland

LC Biology

LC Physics

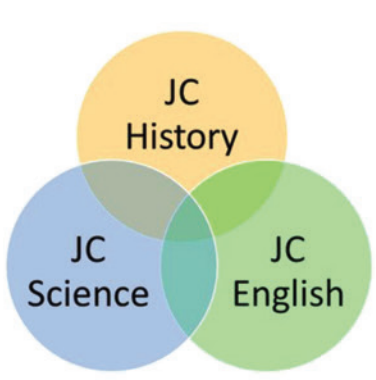
Nominated for Teacher Inspire Award

Cross-curricular and Cross-Sectoral Collaboration

Professional development days are designed to:

- Allow teachers to develop a **cross-curricular, collaborative** approach to the teaching of STEM supporting the key skills and principles of Junior Cycle.
- Introduce teachers to our **online platform** and resources.
- Support teachers employing **story-telling methodology** and **Philosophy for Children (P4C) pedagogy** in their classrooms.
- Provide opportunities to **develop communities of practice** amongst the teachers and facilitate the transition from primary to post-primary school.
- **Share** learning and identify good practice.
- Provide the opportunity for **students and teachers** to **shape and guide the future** of the project.

An tSraith Shóisearach Junior CYCLE



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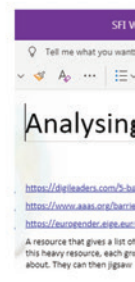

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Prof. Judith Harford, Ms. Rachel Farrell, Dr. Aoibhinn Ni Shuilleabhain, Ms. Marelle Rice, Ms. Karen Maye, Ms. Aoife

itudes / Impacting Futures in STEM

e Platform

A **library** of resources that aim to foster an emotional connection with STEM women leaders through the mechanism of story-telling, which is a powerful tool for developing growth mindset and fostering critical thinking.

Interviews with women working in STEM, such as Dr Marion McAfee in Sligo IT, allow students to discover the range of careers and opportunities that exist in STEM.

ide range of **activities** to port the use of P4C and ytelling pedagogy in the sroom.

Setting the Scene...

Three key messages for students about what philosophical inquiry based learning requires, and expects, from them:

1. Participate
2. Self Regulate
3. Reasonable

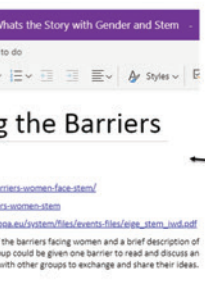
In essence it models a democracy.

Two useful tools to establish Philosophical Inquiry:

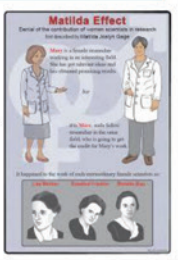
1. Classroom Layout – seating arranged in a circle for Full Fat Inquiry to aid communication, enable self regulation and establish the community.
2. Talking Tool – helps organise dialogue in the group and gives students autonomy and responsibility

One underlying skill:

1. Active Listening



Stimuli to interrogate and explore the issue of gender in STEM and use the past as a lens to analyse the current attitudes toward women in STEM



Joining our project

The next phase of the project is to cascade the model nationally through various teacher networks so that this type of pedagogy is available in all primary and post-primary schools in the country over the next three years.

If you would like to learn more about our project or have your school participate we would love to hear from you.

Contact us: edistem@ucd.ie
rachel.farrell@ucd.ie

@edistem

tive Pedagogy

y for Children (P4C)

lying principle of P4C is for d young people to experience d reasonable dialogue about t matter to them and their

pants work together in a y of enquiry'. The aim for each ot to win an argument but to clearer, more accurate, less dictory and more aware of uments and values before conclusion.

'*Story always improves communication*' Annette Simmons

Storytelling is being advocated as the methodology for this project in order to access the lives, experiences, characteristics, and impact of women leaders of STEM.

Funding and partners

Science Foundation Ireland For what's next
WITS
UCD DUBLIN
IEA Irish Economic Association
edu
UCD Access and Lifelong Learning
the thinker's midwife
wriggle
PhilosophyIreland
Laois Education Centre
PDST Professional Development Service for Teachers | An tSeirbhís um Fhorbairt Gairmiúil do Mhúinteoirí
An Roinn Oideachais agus Scileanna Department of Education and Skills
JuniorCYCLE for teachers

References

[1] OECD (2012). Equity and Quality in Education: Supporting Disadvantaged Students and Schools - Spotlight Report: Ireland, OECD

[2]STEM Education Review Group, (2016). A Report on Science, Technology, Engineering and Mathematics (STEM) Education.

[3]Accenture (2014). Powering economic growth: Attracting more young women into science and technology.

[4]Weir, S., Kavanagh, L., & St. Patrick's College (Dublin, Ireland). Educational Research Centre. (2018). *The evaluation of DEIS at post-primary level: Closing the achievement and attainment gaps.* Dublin: Educational Research Centre

Cantwell, Mr. Brendan Cawley, Ms. Trisha McNeill

Coláiste Íosagáin

Kilmalogue, Portarlington, Co. Offaly

Teachers: Eimear Cribbin (Science) and Roxanne McGee (English and History)

Projects:

Mae Jemison: An investigation on the first black female astronaut to travel in space presented in the form of a poster presentation shaped like a rocket!
Students: Aoibhe Byron and Abi Ryan

Jackie Kaye: A presentation on a female maths teacher in the school who co authored "Maths in Action" with Glen Brennan and Mary Daly
Students: Madison McGettrick, Robbyn Storey and Holly Fosset

Nicola Coogan: A visual display and presentation on a local female scientist.
Students: Maya Lyons, Aoife Healy and Aoibhe Hoary

Vera Rubin: An American astronomer
Students: Myah Stewart and Caoimhe Naughton

Representatives from St. Coleman's National School Mucklagh, Killina Presentation Secondary School, Tullamore College, Oaklands Edenderry, UCD School of Education, Coláiste Iosagáin and St. Philomena's National School pictured at the Bridge House Hotel, Tullamore as they took part in a philosophy for children seminar to learn about enquiry-based learning as part of the trialing of resources for the SFI funded project. This innovative and timely initiative is also supported by: PDST and JCT (capacity building and sharing or expertise and resources); Women in Technology and Science (WITS) & The Irish Economic Association (IEA) (providing female mentors for the participating schools); UCD Access and Lifelong Learning (supporting the recruitment of schools); Laois Education Centre (supporting the recruitment of local schools) and Microsoft Education Ireland (providing on-site visits to the "Dreamspace" in their HQ in Leopardstown and access to female mentors for local schools).

Marelle Rice pictured speaking at the Philosopy for Children seminar

Presentation Primary School

Station Rd, Bracklone, Portarlington, Co. Laois

Teachers: Aisling Dunbar, Keith Maguire and David Browne

Project 1: Marie Cassidy - State Pathologist
Students: Alison Kelly, Lara Redmond, Alex Ryan and Leona Carthy

Project 2: Caroline Herschel
Students: Anna Moran, Emma Brennan, Kayleigh O'Callaghan and Asmaa Haskiya

Project 3: Mae. C. Jemison
Students: Aoife O'Toole, Heidi Byrne, Holly Sherlock and Marina Bove

Project 4: Marie Curie
Students: Kayleigh Murray, Grace Byrne, Aibhín Mc Cann and Chelsea Fox

Project 5: Marie Maynard Daly
Students: Mercy Udi, Coleen Tinkler, Kayla Cunningham and Emma Rose Allman

Project 6: Amelia Earhart
Students: Kelly-Ann Harte Kennerk, Ellie Fenlon and Saoirse Redmond

Project 7: Valentina Tereshkova
Students: Sereena Fenlon, Rianna Donagher and Sophie Lyons

Project 8: Clara Barton
Students: Logan Wrafter, Lana M. Hoey and Yasmin Derveaux

Project 9: Rachel Louise Carson
Students: Holly Mc Auliffe, Lily Rose Bradley Dunne, Sophie Hayden and Faye Wallace

Project 10: Rosalind Franklin
Students: Leah Donagher, Hannah Coleman, Vanessa Deriditi and Chloe Ashe

Project 11: Sheila Tinney
Students: Kate Bambrick, Keileagh Gorey, Carla Anne Forester and Kayleigh Whelan

Project 12: Marie Sklodowska
Students: Anna Houlihan, Kate Murphy, Carla Mc Evoy and Samiya Loughran

Project 13: Mary Zakrueska
Students: Julia Cerazy, Rebecca Lynch, Lainey Carroll and Clodagh Canavan

Project 14: Louise Meitner
Students: Lucia Leinung, Ava Kiernan, Zoe Gibson and Ruby Downes Mears

Project 15: Hedy Lemmar
Students: Sharon Maher, Jennifer Bryan, Ava Baker and Rosalia Munteanu

Project 16: Kate Healy
Students: Molly Conboy Claxton

Killina Presentation Secondary School

Rahan Rd, Killina, Tullamore, Co. Offaly

Teachers: Trisha McNeill (History and German), Miriam Hurley (Science) and Frances Palmer (English and History)

Projects:

Marie Curie: Digital story of the Polish and naturalized-French physicist and chemist who conducted pioneering research on radioactivity.
Students: Sinead Ni Cheilleachair, Holly Gibb, Aine Gaffey

Ada Lovelace: Digital story and brochure of the English mathematician and writer, regarded as the first to recognise the full potential of a "computing machine" and one of the first computer programmers.
Students: Jullie Kelly and Aisling Cotter.

Rosalind Franklin: Digital story of her life
Students: Rosemary Tolbert, Sasha O'Reilly and Abbi Fox

Angela Merkel: Storyboard of the woman who is widely described as the de facto leader of the European Union, the most powerful woman in the world, and "leader of the free world". Although Dr Angela Merkel is a politician, she began her career in science and studied physics at Karl Marx University, Leipzig from 1973 to 1978.
Student: Caitlyn Minnock

Polish Women in STEM: Marie Curie (physicist and chemist who conducted pioneering research on radioactivity) and Olga Malinkewicz (physicist and inventor of a method of producing solar cells).
Students: Aleksandra Piet and Oliwia Brija

Marie Mandy Daly: was an American biochemist. She was the first Black American woman in the United States to earn a Ph.D. in chemistry. Daly made important contributions in four areas of research: the chemistry of histones, protein synthesis, the relationships between cholesterol and hypertension, and creatine's uptake by muscle cells.
Students: Clodagh Bracken, Katelyn Downes and Kate Regan

Katherine Johnson: is an American mathematician whose calculations of orbital mechanics as a NASA employee were critical to the success of the first and subsequent U.S. crewed spaceflights. Johnson was one of the characters portrayed in the acclaimed film “Hidden Figures”.
Students: Abby Ravensburg and Sarah Dillon

Caroline Herschel: was a German astronomer, whose most significant contributions to astronomy were the discoveries of several comets, including the periodic comet 35P/Herschel–Rigollet, which bears her name. She was the younger sister of astronomer William Herschel, with whom she worked throughout her career.
Students: Grace Doyle and Ella McNally

Sally Ride: was an American astronaut and physicist. Born in Los Angeles, she joined NASA in 1978 and became the first American woman in space in 1983. Ride was the third woman in space overall, after USSR cosmonauts Valentina Tereshkova and Svetlana Savitskaya.
Students: Alannah Lynch and Laura Wolan

Ada Lovelace: The daughter of famed poet Lord Byron, Augusta Ada Byron, Countess of Lovelace—better known as "Ada Lovelace"—was born in London on December 10, 1815. A gifted mathematician, Ada Lovelace is considered to have written instructions for the first computer program in the mid-1800s. Her contributions to the field of computer science were not discovered until the 1950s. Her notes were reintroduced to the world by B.V. Bowden, who republished them in Faster Than Thought: A Symposium on Digital Computing Machines in 1953. Since then, Ada has received many posthumous honors for her work. In 1980, the U.S. Department of Defense named a newly developed computer language "Ada," after Lovelace.
Students: Shannon Quinn Flynn and Sophia Thomas O'Connell

St. Colman's National School

Mucklagh, Co. Offaly

Teacher: Keith O'Connor

5th Class Projects

Students: Caelainn Byrne, Ciara Cosgrave, Aisling Eager, Emily Fraser, Katie Hannon, Clodagh Merriman, Niamh Owens, Ciara Prendergast and Aisling Smith

PowerPoint Presentation: exploring STEM, gender bias and discrimination towards women and STEM and attitudes to women in STEM. We also conducted our own surveys and include suggestions on closing the gap between men and women in STEM.

Storyboard Displays: James (Miranda Steuart) Barry AKA (Surgeon), Joan Beauchamp Proctor (Zooologist) and Margaret Hamilton (Mathematician/Computer Scientist/Engineer.

Questions we would most like to ask the famous Women in STEM from the past.

A selection of some famous quotes from Women in STEM

4th Class Projects

Maria Montessori: was an Italian physician and educator best known for the philosophy of education that bears her name, and her writing on scientific pedagogy. Montessori's method, which is based on scientific observations of children, has been used for over 100 years in many parts of the world. The Montessori method views the child as the one who is naturally eager for knowledge and capable of initiating learning in a supportive, thoughtfully prepared learning environment. It attempts to develop children physically, socially, emotionally and cognitively.
Student: Ciara Rose McNeill

Rosalind Franklin: was an English chemist and X-ray crystallographer whose work was central to the understanding of the molecular structures of DNA, RNA, viruses, coal, and graphite.
Student: Katie Condron

Ciara McNeill & Katie Condron have selected some great books to inspire young STEMinists including: Goodnight Stories for Rebel Girls 1 & 2, Girls Can Do Anything, Great Women Who Made History, Little Leaders: Visionary Women Around the World and Katherine Johnson - A Life Story.

Hartstown Community School

Hartstown Rd, Northside, Dublin

Teachers: Siobhán Daly (History) and Darragh Connolly (Science)

Projects include: Hypatia, Elizabeth Blackburn and Grace Hopper

Students: Sophie Hanlon, Grace O'Hanlon, Caoimhe McGloughlin, Abbie Harris, Lauren Hutchinson, Charlotte Forrestor, Kaitlin Devoy, Andrea Bodnariu, Brogan Lambe, Jess Maher, Shannon Kelly, Rebecca Pintican, Emily Reilly, Ciara Hughes, Sarah Hysni, Emma Smajic and Camille Mauhay.

St. Tiernan's Community School

Parkvale, Balally

Teachers: Emma Buggie, Megan McGarrigle and Aideen Brett (Career Guidance)

Projects
Ann Makosinski - Inventor
Valentina Tereshkova - Cosmonaut
Hypatia – Mathematician and Philosopher
Ada Lovelace - Mathematician
Ameenah Gurib Fakim –Scientist and former President of Mauritius
Joan Beauchamp Proctor – Zoologist
Grace Hopper – Computer Scientist
Maryam Mirzakhani - Mathematician
Mary Edwards Walker - Surgeon
Amelia Earhart - Aviator
Dorothy Vaughan – Computer Scientist
Rosalind Franklin – Chemist and X Ray Crystallographer
Sofia Ionescu - Neurosurgeon
Mary Jackson – Computer Scientist
Sylvia Earle – Marine Biologist
Merritt Moore – Quantum Physicist and Ballerina

Students: Sophie Dolores Algarra Duran, Morcos Bustos Ruiz , Sian Cahill, Liam Campbell, Sophie Phelan, Lucy Dempsey, Fran Eberling, Ramon Erra Franquesa, Javier Fernandez Rodrigo, Victor Francisco Luis, Daniel Galindo Goni , Paula Garlito Gutierrez, Victoria Gonzalez Manjoya Surrez, Javier Guillen Moreno, Valentin Martinez Querol, Emily McGearty, Josh O Shaughnessy - Healy, Blanca Prudenciano and Yia Yue Yuan (Lucy).
Chidinma Iwuaba, Devin Kennedy Kiely, Maija Kurcisa, Jael Ngadi, Isaacson, Daniela Stog, Miruna Mihaela Virlan, Lukas Maciulskis, Adriana Inesta Del Casar, Adriaa Porras Ogando, Maya Lopez Garcia, Jorge Lopez Lago, Miguel Carassco, Jaume Salva Quert, Andre Costa Neto
Khaled Abdalla Edris , Kerry Burke and Jasmine Cranny.

St. Mary's

Edenderry, Co. Offaly

Teacher: Lisa Fleming

Student: Alannah Lawton
Project: World's first female Nobel Prize winner, Marie Curie; Podcast from the Past

Student: Tara Richards
Project: Women in Tech: Being an Intel Engineer

Student: Medine Ozbek
Project: STEM Soldier: A female perspective from the frontline. Capt Jane O'Neill

Student: Robynn Foley
Project: A day in the life of a trail blazer. The Diary of Rosalind Franklin

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Teacher: Chris Hanley

Student: Rebecca Kenny
Project: Offaly and Space Michelle MeKeon Bennett.

Student: Allanagh Brophy
Project: Women in the Environment Dr. Fiona Regan.

Teacher: David McEvoy

Students: Kalli Lucas & Cora Cusack
Project: One Giant Leap for Mankind - The Legacy of Katherine Johnson

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Teacher: Pat Costello

Students: Heather Richardson and Mia Byrne
Project: Dr Pamela Byrne (First female CEO of Food Safety Authority of Ireland).

Students: Nishtha Jagili and Amy Evans
Project: Rosalind Franklin (Conducted key experiments which led to discovery of the DNA Double Helix structure)

Teachers: Genevieve Pierce & David Flynn

Students: Shona McNamee, Mairead Flattery, Laura Korkoszynska and Grace Tyrrell.
Project: Rita Levi-Montalcini.

Students: Jemma Farrell and Hannah Thornton
Project: Marie Curie.

Teacher: Caitlin Rigney

Student: Sara Hackett
Project: Ireland's first astronaut, Dr. Norah Patten.

Student: Doaa Eldalil
Project: From teaching to research, Dr Miranda Kiernan

Student: Kamile Juskaite
Project: Finding a cure for sepsis, Dr. Jackie Cooney.

WORKSHOPS

DreamSpace at Microsoft

Through immersive teaching and learning experiences, DreamSpace at Microsoft Ireland will inspire students and teachers to see how technology can enhance education in exciting new ways, helping them to realise the full potential of what they can achieve.

A fun way to learn
At DreamSpace, there's no room for boring. We have designed an experience for Primary School students where fun is the focus. Students will work together, using their ingenuity and creativity paired with innovative technology, to solve problems.

Skills for the future
Along the way, they'll learn essential STEM and 21st Century Learning Design (21CLD) skills in a symbiotic, collaborative and dynamic way that will enable them to imagine the world of the future.

Imagining a world of tomorrow
The DreamSpace experience is designed to teach these important lessons in an informal and impressive way. We're not here to tell kids what they should be when they grow up, we want them to imagine what the world could be. The jobs these students could end up doing may not even have been invented yet. If we can spark their creativity now, we can empower them to create the world of tomorrow, not just live in it.

Delivered by experienced educators
Sessions are supervised by experienced facilitators but we want educators to play a leading role. You know your students and have a deeper understanding of their limitless potential than we ever could. We want to empower you to inspire them. So, we have designed the DreamSpace Primary School Experience to compliment the curriculum and the Department of Education and Skills' STEM Education Policy.

Making dreams reality
A career in technology opens up a world of possibilities. It does not necessarily mean a life of coding. In DreamSpace we'll show students how technology can set them on a path to doing what they love for a living, how they could make their dream job a reality.

Interesting interview with STEM role model - Amanda Joliffe - Dreamspace Lead Microsoft
https://news.microsoft.com/life/dublin-teacher-dreamspace/

wriggle.ie

SchooVR

SchooVR is pioneering a new, immersive way to learn by creating curriculum-aligned virtual reality learning experiences that bring lessons to life. Founded by post primary school teacher Mark Baldwin, SchooVR aims to ensure that every student feels empowered and engaged in their learning experience.

SchooVR's education led 360° virtual experiences are curriculum-aligned, support a variety of different learning abilities and help drive experiential learning.

Our cloud-based platform can be accessed using any smart device via www.schoovr.com

In January 2020, SchooVR is launching its eagerly anticipated Gaeilge version for primary and post-primary schools. We are currently seeking schools to pilot this content.
Please contact team@schoovr.com to register your interest!

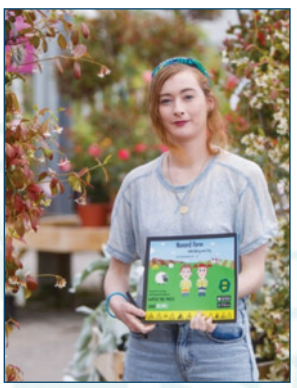
Hazard Farm - Augmented Reality

Anna Carmody - Educational Technologist – founder of littlereddesignstudio.com

Enter the magical experience of **Hazard Farm** by Author Anna Carmody, Founder of Little Red Edu in Partnership with *The Farmer's Journal*.

Teach your children all about farm safety, and watch the pages of the story come alive through augmented reality.

Augmented reality
Augmented reality is a tricky concept to understand, so Anna gives an example; "It's where you can see something that is virtual, through your computer screen and it is merged with reality", she said.

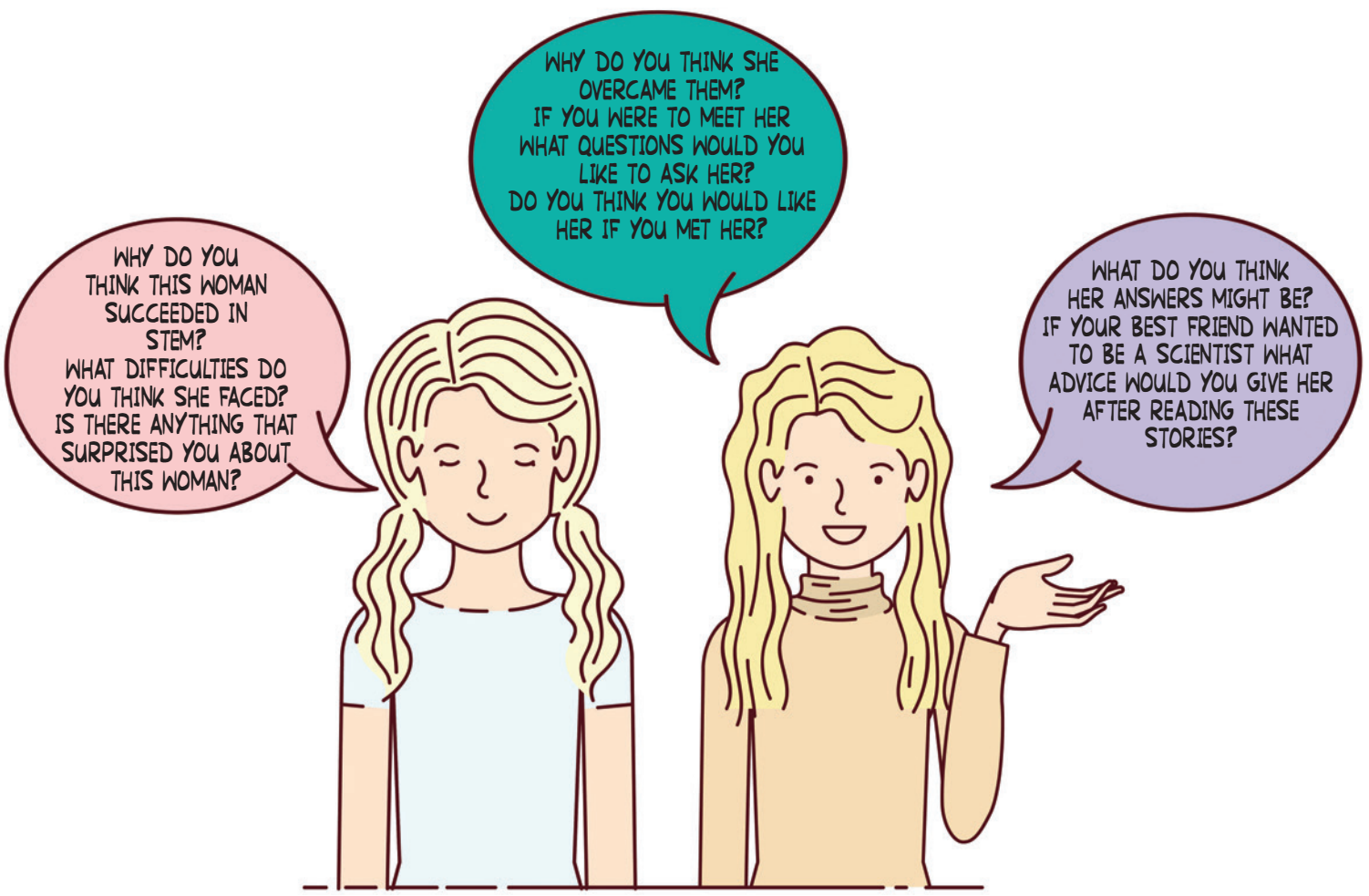


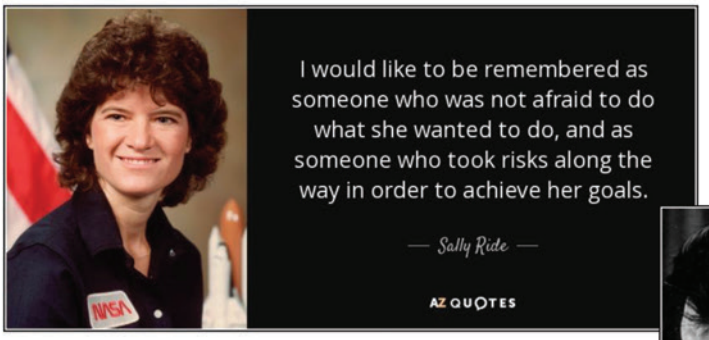
"Basically, If you took a piece of paper, like a flyer and held the phone over it, the phone would recognise the picture on the paper and the images could start moving or information about the flyer could pop up on the page if you are looking at it through your phone," she explained.

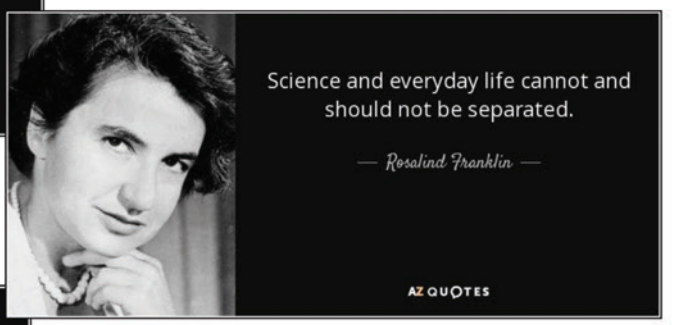
The augmented reality book - Hazard Farm, is quite futuristic in its concept and Anna is sure that kids will love it and equally, learn the importance of farm safety.

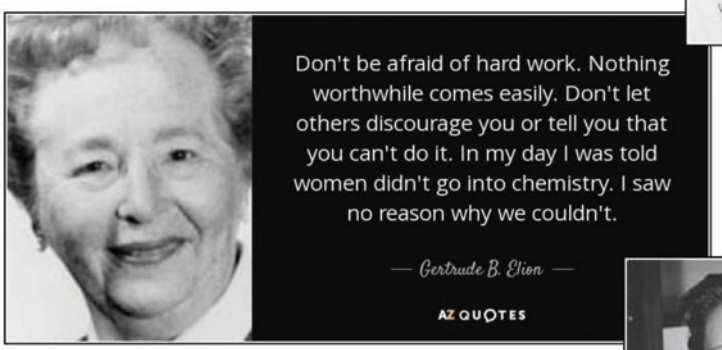
Anna's book can also be read like an average 2D book without the app, which makes it accessible to everybody. It is available in libraries throughout the country and you can find all the information on her webpage littlereddesignstudio.com

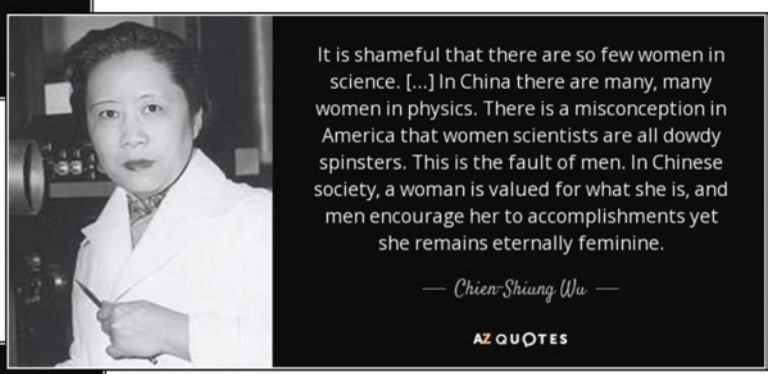
STEM ROLE MODELS – QUESTIONS TO PONDER!

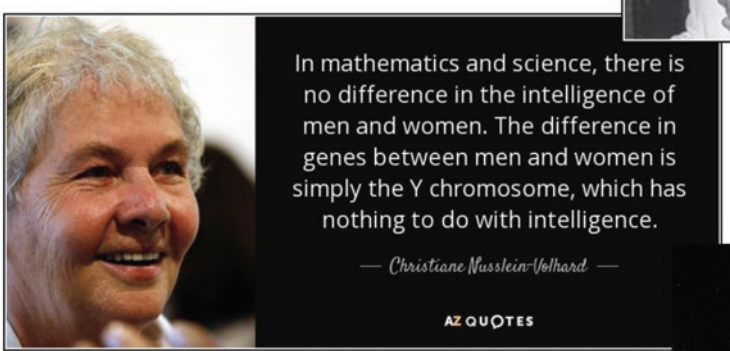


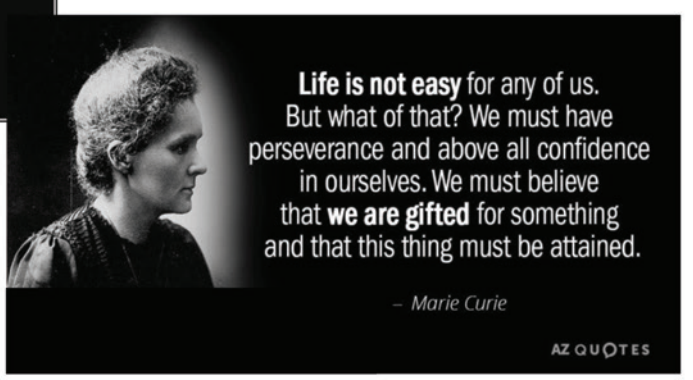












https://www.azquotes.com/quotes/topics/women-in-science.html
https://interestingengineering.com/25-quotes-from-powerful-women-in-stem-who-will-inspire-you

"This job is a great scientific adventure. But it's also a great human adventure. Mankind has made giant steps forward. However, what we know is really very, very little compared to what we still have to know."

– Fabiola Gianotti –

Higgs Boson Physicist

"If you know you are on the right track, if you have this inner knowledge, then nobody can turn you off... no matter what they say."

– Barbara McClintock –

Cytogeneticist and winner of the 1983 Nobel Prize in Physiology or Medicine

"Certain people – men, of course – discouraged me, saying [science] was not a good career for women. That pushed me even more to persevere."

– Francoise Barre –

Virologist who won the 2008 Nobel Prize in Physiology and Medicine

"Science, for me, gives a partial explanation for life. In so far as it goes, it is based on fact, experience and experiment."

– Rosalind Franklin –

Chemist, molecular biologist, and one of the key figures behind unlocking the structure of human DNA

"Don't let anyone rob you of your imagination, your creativity, or your curiosity. It's your place in the world; it's your life. Go on and do all you can with it, and make it the life you want to live."

– Mae Jemison –

First African American woman astronaut in space

"I was taught that the way of progress was neither swift nor easy."

– Marie Curie –

Female STEM superhero,' first woman to win a Nobel Prize, the only woman in history to ever win it twice, and the only human to ever win a Nobel Prize in two different sciences

"Science makes people reach selflessly for truth and objectivity; it teaches people to accept reality, with wonder and admiration, not to mention the deep awe and joy that the natural order of things brings to the true scientist."

– Lise Meitner –

"All sorts of things can happen when you're open to new ideas and playing around with things."

– Stephanie Kwolek –

Chemist who invented Kevlar and winner of the Lavoisier Medal for technical achievements

"If you're beautiful, you're led to believe that you can't also be smart. But you can be fun and fit and social and be really smart. And the smarter you are, the more capable you'll be to handle whatever challenges come up in life."

– Danica McKellar –

Mathematician and The Wonder Years actress of iconic character Winnie Cooper

"As always in life, people want a simple answer . . . and it's always wrong."

– Susan Greenfield –

Neurochemist currently researching Parkinson's and Alzheimer's diseases

GIRLS ROCK STEM