

Enhancing Professional Learning in STEM

Grants programme 2018/19

Overview

This briefing provides an overview of the 24 successful applicants who have been awarded a total of £187,000 grant funding through Education Scotland's new *Enhancing Professional Learning in STEM* Grants Programme.

This new grants programme was launched in October 2018 to build the capacity and confidence of practitioners and to support the implementation of the STEM Education and Training Strategy for Scotland. These exciting opportunities have been developed by a wide range of national partners to support practitioners across all sectors including early learning and childcare, primary, secondary, community learning and development and school-based technical support staff.

Purpose of grants

- Create opportunities for practitioners to meet, learn together and share expertise within clusters, associated school groups (ASGs) and across sectors.
- Provide space for practitioners to work collaboratively across sectors to jointly plan the curriculum and to ensure effective transitions and progression in learning that builds on prior knowledge.
- Build the confidence of educational practitioners in relation to STEM; particularly in sectors such as early learning and childcare, primary and community learning and development.
- Build leadership capacity within the education system for STEM at school/setting, cluster and regional level.
- Deepen and extends the pedagogy and subject knowledge of practitioners to improve STEM learning and teaching.
- Support STEM subject-specific professional learning and coherent interdisciplinary STEM approaches.
- Enable practitioners to forge strong links between STEM and Developing the Young Workforce, equality and equity, digital skills, the Scottish Attainment Challenge and the National Improvement Framework, creativity and Learning for Sustainability.
- Provide 'additionality' by ensuring that professional learning that reaches new audiences and/or builds on and extends existing STEM professional learning provision.

Organisations that successfully bid for funding in the 2018/19 round:

Organisations and charities	Local authorities	Further and higher education
Aberdeen Science Centre Dynamic Earth Institute of Physics Royal Society of Chemistry Scottish Childminding Association Scottish Technicians' Advisory Council Youth Scotland	Aberdeenshire Council East Ayrshire Council East Ayrshire Council and Forestry Commission Glasgow City Council Highland Council Midlothian Council North Ayrshire Council South Lanarkshire Council Stirling Council West Dunbartonshire Council	College Development Network Forth Valley College Glasgow Clyde College New College Lanarkshire University of Aberdeen University of Dundee West College Scotland

Grants allocated in round 2018/19

Organisations and charities

Aberdeen Science Centre

Aberdeen Science Centre will deliver engaging professional learning sessions on a variety of STEM topics to increase the knowledge, skills and confidence of early learning and childcare practitioners and primary school teachers. By the end of March 2019, the aim of the programme will be to deliver 12 sessions in clusters across Aberdeen City and Aberdeenshire reaching up to 240 practitioners. This programme will build on a successful pilot programme in Aberdeen City. Feedback from these sessions indicated that teachers were keen to work together to implement the activities they were taught in their setting. By holding the sessions in the clusters/ASGs, it created valuable opportunities for practitioners to build relationships, learn together, collaborate and share expertise within their clusters/ASGs.

Dynamic Earth

Dynamic Earth will transform the already successful and valued face-to face Creative Science workshops into the first in a series of three online STEM learning modules. The creation of an online platform for innovative professional learning will widen the reach of STEM professional learning for a range of practitioners including primary, additional support needs and community learning and development (CLD) across Scotland. This work will be achieved through an exciting partnership with e-learning experts at the University of Edinburgh and Juniper Leaf Education and be informed by practitioner engagement and feedback. These modules will inspire creative STEM teaching across Scotland.

Institute of Physics

The Institute of Physics (IOP) has an established support network of school partners across the United Kingdom and will now extend this by creating three new professional learning hubs in rural areas in Scotland. These exciting hubs will support high quality, bespoke professional learning for physics teachers and will build relationships with schools and clusters in areas with deprivation in relatively remote and rural locations. Each hub will consist of an experienced physics practitioner as a school-based physics coach (SPC) working with between six and eight partner schools to strengthen pedagogical and subject knowledge. The SPC will lead professional learning for primary and secondary partner schools through the hub network.

Royal Society of Chemistry

The Royal Society of Chemistry (RSC) will enhance the subject knowledge, skills and confidence of practitioners who deliver chemistry lessons across Scotland. The RSC will engage with practitioners to identify their professional learning needs and provide online opportunities for teachers in rural areas to participate in professional learning. In the initial phase the RSC will work with primary practitioners and secondary science teachers across three school clusters. The aim is to increase primary teacher confidence within STEM subjects and promote a seamless transition in learning from P7 to S1. For those in their first five years of teaching chemistry, the RSC will provide an enriching opportunity for up to 60 practitioners to be paired with an experienced mentor to support their professional learning.

Scottish Childminding Association

Scottish Childminding Association (SCMA) and Scottish Schools Education Research Centre (SSERC) will develop and deliver a range of professional learning courses and workshops to promote and increase involvement with STEM learning for childminders across Scotland. SCMA will develop three STEM interactive e-learning courses in partnership with SSERC. Professional learning opportunities will be available online and through face-to-face workshops. A resource pack will be developed to accompany the professional learning and will include activities childminders can offer to parents to support family learning. The materials will be made available on the SCMA website and in the quarterly Childminding magazine to raise the profile of STEM and encourage practitioners to participate in the professional learning opportunities.

Scottish Technicians' Advisory Council

The Scottish Technicians' Advisory Council will develop two professional learning courses for school technicians which take account of recent technological advancements. The two new courses, developed and delivered in partnership with SSERC, will focus on developing knowledge and skills required to safely operate 3D printers, laser cutters, data loggers, sensors and associated software. The professional learning courses will be suitable for technicians new to using these emerging technologies.

Youth Scotland

Youth Scotland will develop professional learning opportunities to upskill primary teachers, CLD practitioners, parents and volunteers in the use of Youth Scotland's Hi-5 STEM activity toolkit. The existing toolkit contains 50 fun challenges to inspire children and young people from the age of five to engage in STEM activities and work towards achieving a SCQF Level 2 Hi-5 award. Youth Scotland will further support up to 160 participants by delivering a series of eight practical workshops across Scotland. The hands-on training will give participants an opportunity to increase their knowledge of STEM, learn how to accredit achievements and inspire young people to engage in STEM by making it fun and engaging from an early age.

Local authorities

Aberdeenshire Council

A partnership approach to enhancing STEM professional learning for those working in CLD settings is being developed by Aberdeenshire Council, Aberdeen City Community Learning and Development Partnerships, together with Aberdeen Science Centre. The partnership will deliver training in Appreciative Enquiry ahead of 6 focus group sessions designed to capture interesting practice in STEM within CLD contexts. Once gathered, these case studies will provide an interesting range of STEM work in action and will be shared more widely to ensure others can benefit from this learning. Building on this, partners will co-design and co-deliver a bespoke learning and development programme for 90 partner CLD staff and volunteers across Aberdeenshire and Aberdeen City. These professional learning sessions supported by Aberdeen Science Centre will bring high quality learning into the heart of delivery and raise awareness of the importance of STEM.

East Ayrshire Council

East Ayrshire Council's project aims to support practitioners as they encourage girls to consider STEM subjects and careers. The project will develop practitioners' knowledge, skills and practice in STEM to create inclusive, inspiring, motivating and engaging learning and teaching opportunities. The project will gather data on girls' attitudes to STEM subjects and career aspirations together with seeking practitioners' views on how to effectively engage girls with STEM. Employers from STEM and rural industries will support practitioners through a networking event. The project will include face to face professional learning supported through online forums to develop practitioners' knowledge and understanding of STEM and rural careers, the skills employers require, and the career pathways to access these industries.

East Ayrshire Council – Learning Outdoors Support Team and Forestry Commission

The professional learning programme from East Ayrshire will inspire practitioners, build confidence skills and knowledge in STEM subjects and help ensure equitable and engaging learning environments. The project will bring cluster practitioners together from early learning and childcare, primary and secondary to learn and work collaboratively. Sessions will be supported by staff from the Forestry Commission, the Environment and Forestry Network and the Collaboration Cluster Team. This joint working will result in a suite of five interdisciplinary lessons from Early to Fourth level focusing on developing STEM skills. Practitioners' professional knowledge will be further supported through a network evening to which businesses, partners and school leaders will be invited and learning will be showcased.

Glasgow City Council

STEM Glasgow, now in its second year, runs a programme of professional learning for practitioners across the city. This grant will support planning for the extension of the successful STEM Glasgow offer to three interested local authorities within the Regional Improvement Collaborative. This offer will enable a greater number of practitioners to benefit from the Primary STEM Leaders Programme providing experiential professional learning for practitioners. Engaging in the programme builds leadership capacity within schools and clusters as practitioners share their learning with others and provide children opportunities to learn through STEM. STEM Glasgow anticipate that three local authorities will engage with this enhanced offer for professional learning. In addition to this fabulous opportunity, STEM Glasgow will offer to 'Train the Trainer' with the well-established STEM in a Context sessions to other interested local authorities within the region.

Highland Council

Highland Council have been delivering on-line courses to Senior Phase students over the last two years. Building on this innovative approach, Highland Council will enable professional learning in STEM to be accessible to colleagues across a large geographical area through the use of an online platform. Professional learning opportunities will be available to all practitioners in Highland and will include two sessions for practitioners in early learning and childcare, two sessions for primary practitioners and three sessions for secondary practitioners. The two Primary Science Development Officers will support and coordinate this exciting work at a cluster level.

Midlothian Council

Midlothian Council will work in partnership with East Lothian Council and City of Edinburgh Council to plan a comprehensive, cross-authority STEM professional learning programme. The programme aims to equip 60 community learning and development practitioners with the knowledge, skills and confidence to deliver STEM programmes within their own settings. Professional learning will be planned and delivered in partnership with the Workers Education Association, the Scottish Schools Education Research Council, Fife College and the Science Ceilidh. Midlothian Council's Equalities Officer will also develop training for practitioners on '*unconscious bias*', addressing gender imbalance and promoting equity of access and opportunity for all learners.

North Ayrshire Council

Following the successful development of the '*Coding the future*' project which trained over 30 staff from the IT Department, libraries and transformation team, North Ayrshire Council will now embark on the creation of a mobile STEM hub with a future plan to host this within one of their secondary schools. The hub will be an inspirational learning space for practitioners and STEM Ambassadors to meet, learn and share knowledge, skills and expertise. As part of a recent design competition learners were asked to develop a logo for the North Ayrshire STEM brand which will feature in the exciting new STEM Hub to promote and encourage learners, practitioners and communities to engage with STEM.

South Lanarkshire Council

The new Youth, Family and Community Learning Service in South Lanarkshire will facilitate the delivery of 350 hours' worth of professional learning through a series of four STEM based activities. Six practitioners will be trained to deliver the Young Navigator Award and the Bronze and Silver Level National Navigation Award Schemes. Four practitioners will be trained in the use of Lego Mindstorms through online and in-house workshops. John Muir Award Leader Training will also be delivered to four practitioners which will enable a greater number of learners to benefit from participation in the award. A further five practitioners will be trained in the use of Autodesk 3D Modelling and 3D printing. This varied range of professional learning opportunities will provide practitioners with the skills and confidence to inspire learners across communities whilst closing the equity gap and growing the learning culture within community learning and development.

Stirling Council

Stirling Council aim to expand their current STEM Network to include 80 primary and early learning and childcare practitioners from across the authority. Seven representatives will be identified from secondary clusters and targeted support will be provided from the Stirling Council Early Years Team to ensure standalone nurseries are represented in the network. The main aim of the strengthened STEM Network will be to implement a new *Stirling STEM Challenge* which will tie in with British Science Week. After participating in the exciting challenge, the winning team from each establishment will produce a video of their winning presentation for submission to an external judging panel. Finally, learners and practitioners will be involved in a showcase event which will celebrate success and share good practice among schools and early learning and childcare settings.

West Dunbartonshire Council

Building on the success of the *Step Up* project which focused on raising attainment in numeracy using creative activities, West Dunbartonshire Council (WDC) will now expand this work to include further STEM contexts. Following an initial scoping exercise, WDC will develop first and second level mathematics and numeracy resources. Following a trial with learners and practitioners, '*how to*' videos will be produced and uploaded to a digital platform. Professional learning sessions will be held locally to share the new resources and made available through Education Scotland's online digital platform to benefit learners and practitioners nationally.

Further and higher education

College Development Network

The College Development Network (CDN) will work in partnership with Digital Maker CIC, Censis and ODI Aberdeen/Code the City to pilot professional learning and teaching resources related to the *Internet of Things* (IoT). Working with two primary schools, one secondary school and a local college, the project will focus on practical activities linked to local issues and real-life industry, highlighting learner progression pathways and developing professional support networks. Half day workshops will include the principles of data science; the use of low-cost sensors that can be built by students and practical data collection and analysis tasks. Practitioners will gain hands-on experience which can be applied in their own settings to embed STEM skills within the curriculum. All materials will be made available under an open licence.

Forth Valley College

Forth Valley College (FVC) will work strategically with a wide range of partners from three different local authority areas in order to develop effective STEM practice in Clackmannanshire, Falkirk and Stirling. Ten local primary schools will be involved in piloting on-line STEM support materials for first and second levels. Six local STEM knowledge exchange events will be delivered to provide professional learning and networking opportunities for 60 practitioners from early learning and childcare settings and primary schools and 60 secondary practitioners. FVC will also provide up to 18 secondary science practitioners with the opportunity to engage in a three day course to develop science skills which can be shared with cluster colleagues.

Glasgow Clyde College – Community Learning and Development

Glasgow Clyde College will deliver three one-day workshops across Scotland for up to 25 CLD and Family Learning practitioners. The workshops will be delivered by the Glasgow Clyde College team whose work has been recognised with awards in 2017/18 for *Education Initiative of the Year for Family Learning and Science* and *Promoting Educational Attainment across the Family*. Glasgow Clyde College CLD project will create opportunities for practitioners to meet, learn together and develop their expertise. The main aim is to raise the skill levels and confidence of CLD practitioners to enable them to provide high-quality community based STEM learning across the country. The anticipated impact will be an increased number of adults actively engaged in STEM learning in community contexts.

New College Lanarkshire

New College Lanarkshire will lead a multi-agency, collaborative project to support the delivery of a cohesive pipeline of STEM activities from early years to SCQF level 6/7 in the Lanarkshire region. The first stage of the project will be to undertake a scoping exercise with the full range of stake-holders through telephone consultations, face-to-face discussions, online surveys, school cluster focus groups and meetings. Consultations with stakeholders and additional research activity will be used to identify the priorities for the future development of innovative professional learning opportunities aligned to the needs of practitioners. The output from the scoping exercise and consultation will inform the future development of STEM-related units for the *Early Learning and Childcare Curriculum* delivered at New College Lanarkshire.

University of Aberdeen

The University of Aberdeen will engage with a wide range of stakeholders including teachers, pupils, parents, academic societies, science associations and the wider community to identify the skills and knowledge gaps of practitioners involved in the delivery of STEM education. This initial scoping exercise will highlight areas in which innovative online professional learning modules could be developed to address the professional learning needs of practitioners. The project will also consider how to embed equality, diversity and inclusive practice within the delivery of the science curriculum.

University of Dundee

The *Funds of Knowledge STEM Programme* will encourage children, families and communities to develop STEM capital and promote STEM careers. The project will draw on research to enhance the skills, competence and confidence in science education of primary teachers within the Tayside Regional Collaborative. The programme will expand collaboration as part of a university-school-community partnership and help generate relevant STEM learning in the curriculum. New curriculum study groups, will consist of up to 50 practitioners, headteachers, CLD and initial teacher education students. The groups will begin to analyse local knowledge and develop strategies to benefit from existing community STEM knowledge. This exciting partnership will positively impact STEM learning and teaching and the experiences on offer within local communities.

West College Scotland

Building on the success of a network of West College Scotland coding clubs in schools across Renfrewshire, award-winning West College Scotland Lecturer and Microsoft Innovative Educator Expert Dr. Amanda Ford will develop a comprehensive professional learning programme for primary practitioners. A suite of digital resources will be produced to enable practitioners to run their own coding clubs and Mini Game Jam events. In addition to the digital resources, which will be made available for all practitioners through Glow, West College Scotland plan to deliver three complementary training sessions which aim to engage 75 practitioners from across Scotland. The resources and training sessions will encourage collaborative working among primaries and associated secondary schools and support teachers with the delivery of events within their learning communities.

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