STEM Strategy

August 2019
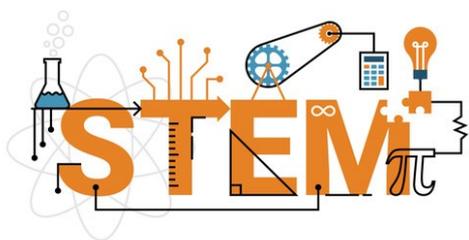
Year 2 of 3 Year Plan

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INTRODUCTION

What is STEM?

Sciences, technology, engineering and mathematics (STEM) education supports high-quality learning within each of its constituent subject areas and enables learners to apply their learning using stimulating inter-disciplinary contexts. STEM education helps learners to develop a wide range of valuable skills such as creativity, problem solving, communication, project management, team working, critical thinking, analysing, evaluation and systems thinking skills. Learners can be highly motivated and engaged by STEM learning experiences, especially when they involve practical enquiry or problem-based approaches which are relevant to real-life applications and the world of work.

All of STEM is underpinned by mathematics, which includes numeracy. Digital literacy skills play an increasingly important role in the economy and society and are an important part of STEM education. Some schools and authorities also see the Arts and creativity as having a vital approach to play in STEM education – this is often referred to as a STEAM approach.

Why is STEM important?

- STEM skills are seen to be key to the Scottish economy and the future prosperity of its citizens

- Many companies and industries are reporting difficulties in recruiting people with STEM skills which is affecting their ability to bring in new business and attract investment

- In the UK, it is estimated that there could be 11,000 job opportunities in ICT and digital technologies each year

- It is estimated that the UK requires 820,000 sciences, engineering and technology professionals by 2020

- In a CBI survey, 48% of employers said they prefer graduates with STEM skills – STEM skills help our young people access jobs across many sectors, not just in STEM

- The many rewarding and well-paid careers offered by STEM can support national efforts to tackle youth unemployment, poverty, social exclusion and the gender pay gap

- STEM skills help individuals function and thrive in an increasingly scientific and technological world and equip them with scientific literacy skills needed to make informed decisions about complex ideas.

- STEM endeavours have brought about dramatic improvements to our quality of life and have helped to improve our physical and natural environments and improve our nation's health and wellbeing

- New knowledge resulting from STEM research, discovery and invention has fuelled our collective global imagination and sense of wonder – from the detection of gravitational waves to the marvel of nanotechnologies.

For the reasons above, STEM is seen to be at the heart of *Developing Scotland's Young Workforce* and has a key role to play in tackling inequity through the *Scottish Attainment Challenge* and raising attainment in literacy and numeracy in line with the ambitions of the *National Improvement Framework*. STEM also features in *Delivering Excellence and Equity: A Delivery Plan for Scottish Education*.
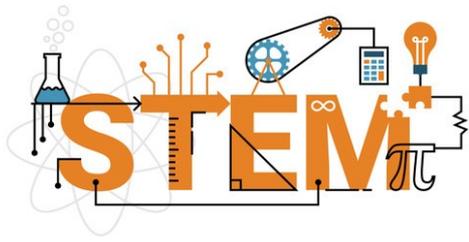
What are the challenges with STEM?

If we are to make progress with STEM education then we need to be clear about the challenges we face:

- Many young people enjoy their experiences of STEM at school but rule themselves out of further study or STEM careers because of misguided notions that they 'are not brainy enough' to succeed

- Young people can have a very narrow view of STEM careers (scientist in white coat, maths teachers etc.) and don't understand that STEM opens up many careers options – both within and out with STEM sectors

- Peers, parents/ carers can sometimes inadvertently perpetuate negative views of STEM as 'geeky' or 'difficult'

- Teachers, parents/ carers are key influencers over young people's career choices and need to be supported to provide positive encouragement and effective and accurate STEM career information to children and young people

- Young people and adults sometimes have a fear or anxiety in relation to mathematics which needs to be overcome through effective interventions and support

- We have a gender imbalance across STEM with girls being under-represented in physics, computing science and technologies and boys being under-represented in biology – this has persisted for more than 30 years

- Many STEM career interventions focus on learners in the senior phase of secondary school when research shows that young people are often making decisions about their careers in primary school – hence the focus in this framework on coherent and progressive STEM learning from 3-18 years

- Practitioners in early learning and childcare and primary sectors can lack confidence in teaching STEM due to a lack of specialism in this area and also due to difficulties in accessing support from industry and providers

- We need to promote a 'STEM for all' approach to highlight the various rich and rewarding learner pathways such as Foundation Apprenticeships and college and work-based learning – so STEM isn't seen as being solely for those wishing to pursue advanced study through a school to university route

- There are equity issues in school subjects like physics and chemistry with an under-representation of young people from deprived areas

- At times, there can be an over-reliance on STEM competitions, projects and awards which, although very important, can detract from the whole-establishment strategies that can bring real and lasting transformative change to practice and pedagogy that benefits all learners.
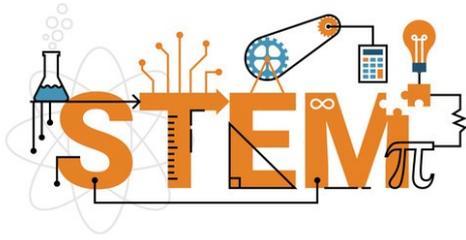
The STEM Strategic plan for Auchenharvie Academy and its cluster will focus on 5 main areas;

- Transitions and S1 (Year 1), rolling out to Transition, S1 and S2 year 2 and Transition, S1, S2 and S3 in year 3.

- Improving the STEM Profile in the schools and wider community

- Curriculum and assessment

- Leadership

- Establishing international links, collaborating on STEM projects.

Auchenharvie Academy key objectives		
Action	**Strategy and Implementation**	**Timeline & Responsibility**
Transition and S1	P7 STEM Challenge Day Extending the challenge to incorporate a Maths element/ angles for launch	Nov 2019 STEM Working Group All STEM Subject staff involved in the day
	S1 STEM Awareness Activity F1 STEM Challenge in last term involving joined up learning in Maths, Science and Technical Development of series of lessons surrounding F1 theme, conducted during WG time (collegiate)	TBC 2020 STEM Working Group
	S1 External agent (link with summer term challenge)	A McKeown

Auchenharvie Academy key objectives		
Action	**Strategy and Implementation**	**Timeline & Responsibility**
Improving profile of STEM in school and wider community	TWITTER page.	Ongiong P Keaveny and A McKeown
	STEM Clubs (lunchtime) Space Club (A Lynch), Coding (Computing), Science Club (D Lodge), F1 (A McKeown) Working with external agents in regional and national challenges/ competitions. Various year groups, mostly BGE	Weekly Teachers as indicated STEM Students (where applicable)

Auchenharvie Academy key objectives		
Action	**Strategy and Implementation**	**Timeline & Responsibility**
Leadership	Young STEM Leader award	Ongoing throughout session A Lynch (Physics)
	STEM Club Students delivering activities to STEM clubs in Primary	Over the course of the session Information needs to go out to Cluster Primary for them to schedule a STEM week (avoiding March/April)

Auchenharvie Academy key objectives		
Action	**Strategy and Implementation**	**Timeline & Responsibility**
Establishing international links, collaborating on STEM projects.	Form links with International schools and devise plan/ programme of work for International collaboration on STEM projects, for	2019-20 implementation of programme K Scott