

Defining STEM

The tables below have been taken from the STEM Evidence Base Report which was published alongside the STEM Education and Training Strategy [<http://bit.ly/STEMstrategy>]. The tables detail qualifications, awards, apprenticeship frameworks and subjects in which STEM features strongly.

The tables below should not be seen as being exclusive. Many other subjects and qualifications, not listed below, make important contributions to STEM and include aspects of STEM-related learning. The contribution to STEM, from so many areas of learning, is what makes it such a rich and motivating context for learning. It is important to note too that the list below will not remain static. New STEM-related pathways are likely to be developed to meet the changing needs of society and industry.

It is hoped that this brief document helps practitioners develop a better understanding of what we mean by STEM and how learners are access STEM learning within various sectors.

What is STEM?

There is no single definition for STEM. STEM can be conceived as a set of inter-related disciplines and required skills. STEM related education and training seeks not only to develop expertise and capability in each individual field, but also to develop the ability to work across disciplines and generate new knowledge, ideas and products through inter-disciplinary learning. The different components of STEM are defined as follows in the STEM strategy:

Science enables us to develop our interest in, and understanding of, the living, material and physical world and develop the skills of collaboration, research, critical enquiry, experimentation, exploration and discovery.

Engineering is the method of applying scientific and mathematical knowledge to human activity and **Technology** is what is produced through the application of scientific knowledge to human activity. Together these cover a wide range of fields including business, **computing science**, chemicals, food, textiles, craft, design, engineering, graphics and applied technologies including those relating to construction, transport, the built environment, biomedical, microbiological and food technology.

All of STEM is underpinned by **Mathematics**, which includes numeracy, and equips us with the skills and approaches we need to interpret and analyse information, simplify and solve problems, assess risk and make informed decisions. Mathematics and Numeracy develop essential skills and capabilities for life, participation in society and in all jobs, careers and occupations. As well as providing the foundations for STEM, the study and application of mathematics is a vast and critical discipline in itself with far-reaching implications and value.

Digital skills also play a huge and growing role in society and the economy as well as enabling the other STEM disciplines. Like Mathematics, digital skills and digital literacy in particular are essential for participation in society and across the labour market. Digital skills embrace a spectrum of skills in the use and creation of digital material, from basic digital literacy, through data handling and quantitative reasoning, problem solving and

computational thinking to the application of more specialist computing science knowledge and skills that are needed in data science, cyber security and coding. Within digital skills, as noted above, computing science is a separate discipline and subject.

Broad general education (3-15 years)

STEM education can be used as a highly motivating and relevant context for learning within the broad general education phase of Curriculum for Excellence. It can be used to support all four contexts for learning:

- Curriculum areas
- Ethos and life of the school
- Interdisciplinary learning
- Opportunities for personal achievement

STEM contexts can also support learning across all eight curriculum areas, and in particular within sciences, technologies and mathematics.

Areas which are the responsibility of all, especially numeracy, but also literacy and health and wellbeing, can also be supported through STEM contexts and approaches.

Cross-cutting themes such as learning for sustainability, digital skills and creativity support STEM. Outdoor learning provides learners with opportunities to learn about the impact and contribution STEM makes to their lives, their communities and society.

Senior phase

Qualifications	
Mathematics	Design and Technology
Lifeskills Mathematics (National 2)	Engineering Science
Applications of Mathematics	Fashion and Textile Technology
Mathematics	Graphic Communication
Mathematics of Mechanics	Health and Food Technology
National Units in Numeracy	Information and Communications Technology
Statistics	Music Technology
Statistics Award	Practical Electronics
	Practical Metalworking
Sciences	Practical Woodworking
Biology	
Chemistry	
Environmental Science	
Human Biology	Skills for Work qualifications
Physics	Automotive skills; Building services engineering; Construction crafts; Creative digital media; Energy; Engineering skills; Food & drink manufacturing industry; Laboratory science; Practical experiences: construction and engineering; Skills for work in the textile industry
Science	
Science in the Environment	
Technologies	
Computing Science	
Design and Manufacture	

Further and higher education subjects

College FE Superclasses	
C: Information Technology and Information	T: Construction and Property (Built Env't)
Computer Technology	Built Environment (general)
IT: Computer Science / Programming / Systems	Property: Surveying/Planning/Development
Information Systems / Management	Building Design/Architecture
Text / Graphics / Multimedia Presentation Software	Construction (general)
Software for Specific Applications / Industries	Construction Management
Information Work / Information Use	Building/Construction Operations
	Civil Engineering
N: Catering/Food/Leisure Services/Tourism	Structural Engineering
Food Sciences/Technology	
	V: Services to Industry
P: Health Care/Medicine/Health and Safety	Industrial Design/Research and Development
Health Care Management/Health Studies	Engineering Services
Medical Sciences	
Complementary Medicine	W: Manufacturing/Production Work
Paramedical Services/Supplementary Medicine	Testing Measurement and Inspection
Medical Technology/Pharmacology	Chemical Products
Dental Services	Polymer Processing
Ophthalmic Services	
Nursing	X: Engineering
Semi-medical/Physical/Psycho/Therapies	Engineering / Technology
Psychology	Metals working / Finishing
	Welding / Joinery
Q: Environment Protection/Energy/Cleansing/ Security	Tools / Machining
Environmental Protection/Conservation	Mechanical Engineering
Energy Economics/Management/Conservation	Electrical Engineering
Pollution/Pollution Control	Power / Energy Engineering
Environmental Health/Safety	Electronic Engineering
	Telecommunications
R: Science and Mathematics	Electrical / Electronic Servicing
Science and Technology (general)	Aerospace / Defence Engineering
Mathematics	Ship/Boat Building/Marine/Offshore Engineering
Physics	Road Vehicle Engineering
Chemistry	Vehicle Maintenance / Repair
Astronomy	Rail Vehicle Engineering
Earth Sciences	
Land and Sea Surveying / Cartography	Y: Oil/Mining/Plastics/Chemicals
Life Sciences	Mining/Quarrying/Extraction
	Oil and Gas Operations
S: Agriculture, Horticulture and Animal Care	Chemicals/Materials Engineering
Agricultural Sciences	Metallurgy/Metals Production
Agricultural Engineering/Farm Technology	Polymer Science/Technology
Veterinary Services	

Foundation apprenticeships

FA Frameworks
Civil Engineering
Creative and Digital Media
Engineering
Hardware and System Support
Scientific Technologies (Laboratory Skills)
Social Services and Healthcare
Software Development

Modern apprenticeships

MA Frameworks	
Agriculture	Heating, Ventilation, Air Conditioning and Refrigeration
Aquaculture	Horticulture
Automotive	Information Security
Bus and Coach Engineering and Maintenance	Industrial Applications
Construction: Building	IT and Telecommunications
Construction: Civil Engineering	Land-based Engineering
Construction: Professional Apprenticeship	Life Sciences and Related Science Industries
Construction: Specialist	Network Construction Operations (Gas)
Construction: Technical	Pharmacy Services
Construction: Technical Apprenticeship	Plumbing
Creative and Digital Media	Power Distribution
Dental Nursing	Process Manufacturing
Electrical Installation	Rail Engineering
Electronic Security Systems	Trees and Timber
Engineering	Upstream Oil and Gas Production
Engineering Construction	Water Industry
Equine	Water Treatment Management
Gas Heating & Energy Efficiency	Wind Turbine Installation and Commissioning
Gas Industry	Wind Turbine Operations and Maintenance

Graduate-level apprenticeships

Graduate Level Apprenticeships
Engineering: Design and Manufacture (SCQF level 10)
IT: Software Development (SCQF level 10)
IT: Management for Business (SCQF level 10)
Civil Engineering (SCQF level 8)

Updated: Dec 2017