**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**

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| **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**

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| **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**

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| --- | --- |
| **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**

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| **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) |

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