Learning Progression Pathways:

An Introduction

A **Learning Pathway**, for a specified key area, maps how a learner's understanding and skills can progressively be strengthened and deepened through the years of their education.

A Learning Pathway can be described by a series of short statements describing the level of understanding a learner can typically attain, about particular strands of the key concept area concerned, at each stage in school or beyond. **Analysis of a Learning Pathway suggests how teaching of its core ideas can most effectively be planned and interconnected:**

- to reinforce understanding by exploring how ideas introduced in one subject context are often of much wider significance
- to make full use of previous learning as a platform for further progression

Work on mapping Learning Progressions has been pioneered in the USA, notably through the *Atlas of Science Literacy,* published by the American Association for the Advancement of Science[1], and within the *Taking Science to School* Report of the National Research Council[2]

STEM-ED Scotland's work in this area stems from its project ***Connecting it up: towards a Route Map for STEM Education***. That study was developed through consultations involving approximately 100 volunteer teachers, most of whom were recruited through the Association for Science Education, Scotland (ASE), the Scottish Mathematical Council (SMC), and the Scottish Technology Teachers Association (STTA)[3]. That project drafted Learning Pathways in five selected areas, representing a relatively diverse range of themes, namely:

Models in STEM
Genetics and Inheritance
Measurement, Units and Scale
Mechanical Systems
Energy

The documentation for each Pathway identifies how each statement of understanding, at every stage, can be addressed within the broader national curriculum guidance. In Scotland, for ages 3 – 15. this guidance consists of series of specified ***Experiences and Outcomes*** in each of eight subject groupings. Three of these groupings cover the STEM spectrum, viz. Numeracy & Mathematics, the Sciences and the Technologies.

Following completion of the funded project, STEM-ED Scotland and its collaborative partners are working to support adoption of the Learning Pathways approach in Scottish schools. It has been agreed to focus initially on the **Measurement, Units and Scale** Pathway, as a leading exemplar, of importance to all STEM subjects, and developed over many years of learning.

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[1] American Association for the Advancement of Science. (2007). *Atlas of Science Literacy, Volumes 1 and 2*. Project 2061. Washington, DC: Also available from http://www.project2061.org/publications/default.htm

[2] National Research Council. *Taking Science to School: Learning and Teaching Science in Grades K-8*. Washington, DC: The National Academies Press, 2007, Chapter 8.
Also available from http://www.nap.edu/catalog.php?record_id=11625

[3] Details of the project, including a Report and other documented outputs, are available from http://www.gla.ac.uk/colleges/scienceengineering/stemed/routemapforstemeducation/ The project was funded by the Esmée Fairbairn Foundation, with some supplementary support from the Scottish Government.