

## Readying learners for a data-driven world

### Why are data skills important?

Data skills are to the 21st Century what reading and writing were to the 20th. The digital technology revolution has put data at the core of many things, from personal privacy and public health, to running organisations and tackling the climate crisis.

As the coronavirus pandemic has so vividly shown us, a basic level of data literacy is critical for every citizen, even those who don't regularly work with data as part of their job. But as every industry becomes increasingly digitised and data-driven, from health care to agriculture, engineering, marketing, hospitality, sport, and even the arts, data skills are becoming more important than ever across the range of possible careers.

In Scotland alone, there are lots of companies using data in incredible ways to solve some of the world's most pressing problems. A few examples are: IGS, an Edinburgh-based company using sensor data to develop smart systems for vertical farming, with the aim of tackling food shortage and climate change (Figure 1); Space Intelligence, who use satellite imaging data to work out the best places to plant carbon-capturing forests; and Skyrora Design, a literal rocket science company that carefully monitors



**Figure 1** - IGS are an Edinburgh-based company that uses sensor data to monitor and develop smart systems for vertical farming, with the aim of tackling food shortages and climate change.

data on the positions of satellites and space debris in order to safely launch their rockets into space.

The rapidly increasing demand for people with data skills in the workforce means that Scotland (and the whole UK) now faces a significant data skills gap. For this reason, it is imperative that learners are introduced to data skills in school.

### What is data literacy and how can schools teach it in BGE?

Data literacy is the ability to ask questions, collect, analyse, interpret, and communicate stories about data (Figure 2). An enquiry based

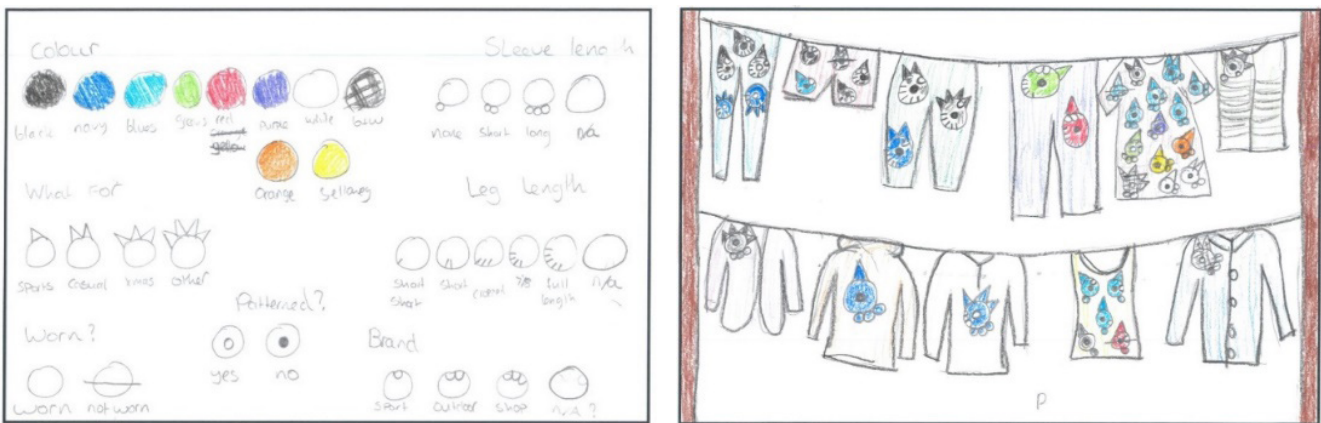
framework called PPDAC (Problem, Plan, Data, Analysis, Conclusion) is used to help structure learning. In choosing a problem to solve, it's helpful for learners to pursue something that is meaningful and motivating to them.

You might assume that teaching data skills would most naturally sit in the context of numeracy, but teachers are very likely already teaching aspects of data literacy in other subjects, such as maths, social sciences, geography, modern studies, environmental science, >>



**Figure 2** - Telling stories with data. (Image source: @kdnuggets)

# Activities & Professional Learning



**Figure 3** - An interdisciplinary activity that brings together art and personal data in a beautiful and gentle way. This resource can be freely downloaded from <https://dataschools.education/resource/dear-data-6-lessons/>.

physical and life sciences, and computing science. Moreover, the opportunity to *apply* data skills exists in almost every subject in the Scottish curriculum. For example, learners in Physical Education could analyse their step counts and activity levels and work out where they're most stationary or active in school. In Music, learners could create compositions using data sonification with <http://musicalgorithms.org/3.2/>, where different sounds or notes are played with different values of a dataset. Or in Geography, the Census

data could be studied to learn more about your neighbourhood using [datashine.org.uk](http://datashine.org.uk), or find out how many accidents have happened on the roads outside your school using [crashmap.co.uk](http://crashmap.co.uk).

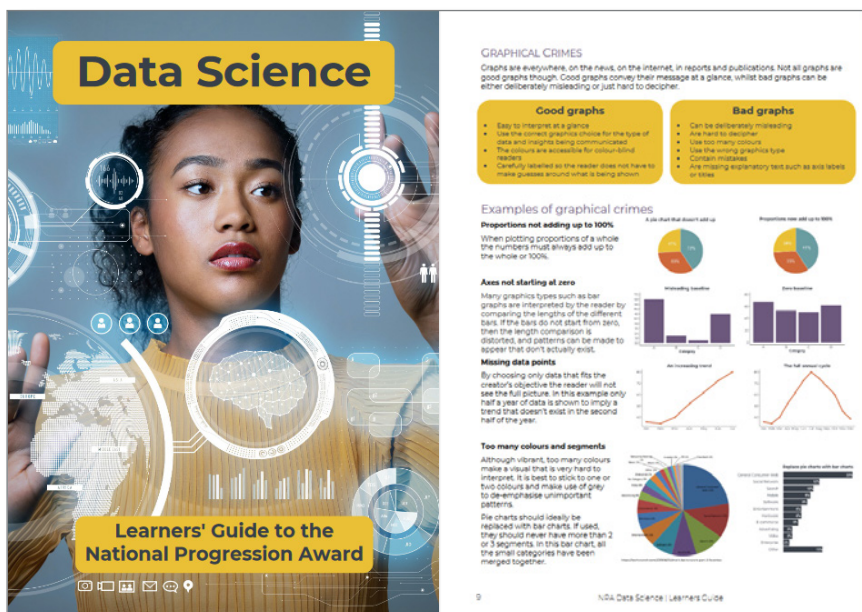
The Data Education in Schools team have developed a range of free, high-quality, engaging interdisciplinary resources that support teachers to help enhance (or recognise) their data literacy teaching in the context of the curriculum. This growing library of teaching resources and

professional learning videos is searchable by theme, level and area, and can be found at <https://dataschools.education/data-education-resources/> (see Figure 3).

## The NPA Data Science

For senior Secondary learners, there now exists a new National Progression Award in Data Science (Levels 4, 5, 6), which is possibly the world's first data science qualification designed specifically for school learners! See Figure 4.

A National Progression Award is designed to provide learners with the knowledge and skills needed to progress to further learning or employment. NPAs focus on specific areas such as cyber security, computer programming and data science. NPAs are nationally recognised qualifications that deliver real-world skills. At Level 4 (National 4) the qualification will take 80 hours to deliver. At Level 5 (National 5) and Level 6 (Higher) the qualification will take 120 hours to deliver. >>>



**Figure 4** - Excerpts from the Learners' Guide to the NPA Data Science.

# Activities & Professional Learning

The qualification covers data literacy, data citizenship, data ethics, data analysis, statistics, and, optionally, computer programming. Learners will find out what data science is used for, the principles behind it, and gain practical skills in analysing large datasets. They will be able to apply these skills in their personal lives, at university and in employment.

The qualification is designed to be accessible to every learner, and teachable by every teacher. A range of support materials are available for teachers and learners. There's a Learner's Guide, which covers the contents of most of the qualification, and an Educator's Guide to help teachers prepare for and deliver the qualification. Both can be found at <https://dataschools.education/about-data-literacy/npa-data-science/>. There's also a range of lessons and assessments available for most of the units within the qualification (<http://learn-data.science/>).

If you would like further support to engage with data science in your classroom, Data Education in Schools are offering a number of professional learning courses in 2023. They will also be running a free four-day course with dates across



February through May, on teaching data science in the secondary classroom, including the NPA Data Science. In partnership with SSERC, they are offering a one-day course data science in the secondary classroom (**8th June 2023**), check the [SSERC website](#) for further details.

**About Data Education in Schools**  
Data Education in Schools is developing an interdisciplinary data education curriculum for Scotland and a set of engaging real world data science teaching materials for primary and secondary school teachers. The team brings together academics, qualified teachers and STEM professionals with expertise from industry and local government.

The Data Education in Schools project is part of the Edinburgh and South East Scotland City Region Deal Skills Programme, funded by the Scottish Government.

If you would like more information, or a free poster for your classroom highlighting examples of data careers spanning a range of sectors, send an email to [dataschools@ed.ac.uk](mailto:dataschools@ed.ac.uk). <<

