



# National Unit Specification

## General information

**Unit title:** Data Citizenship (SCQF level 6)

**Unit code:** J890 46

**Superclass:** CB

**Publication date:** October 2024

**Source:** Scottish Qualifications Authority

**Version:** 01

## Unit purpose

The purpose of this unit is to provide an overview on the place of data in society, how data can be used and misused, and the steps we can take to understand and use data responsibly. This unit will help learners become responsible, data literate citizens who participate in the decisions that affect people and society.

This is a **non-specialist** unit, suitable for a wide range of learners. It is suitable for learners who require to develop their knowledge of data science from a non-specialist perspective, perhaps in the role of a citizen data scientist. It is recommended that learners possess well developed data literacy skills before attempting this unit.

Learners will gain a range of practical skills and acquire relevant underpinning knowledge. They will learn how to interpret meaning from visualisations, such as graphs and charts, and to design and carry out surveys to gather data. They will learn about how data can be used in society for positive and negative effects. They will also learn about data security and their rights and responsibilities when using and storing data.

Learners will also consider the use of data in AI tools that make use of large amounts of data (such as Generative Artificial Intelligence (AI) and Machine Learning) and will evaluate the quality of the output and consider how much to trust the output of AI tools.

# National Unit Specification: General information (continued)

**Unit title:** Data Citizenship (SCQF level 6)

On completion of this unit, learners will understand the data science process and be able to identify opportunities to apply that process to gain insights into large datasets. Learners will also gain skills in interpreting data and creating data visualisations.

On completion of this unit, learners will have gained confidence in their use of data and be aware of their rights and responsibilities as data citizens. Learners may progress to other units at this level, such as J8LW 46Data Science at SCQF level 6, or further develop their knowledge and skills in this area by undertaking more advanced qualifications at SCQF level 7.

Completing the Data Citizenship and the Data Science units at SCQF level 6 as well as one optional unit will allow them to be awarded the National Progression Award in Data Science at SCQF level 6. Learners could also progress onto other STEM qualifications such as the National Progression Award in Cyber Security at SCQF level 6 or the Higher Applications of Mathematics course.

## Outcomes

On successful completion of the unit the learner will be able to:

1. Explain the use of data in society.
2. Explain data literacy concepts.
3. Gather data to investigate a problem.
4. Interpret complex data

## Credit points and level

1 National Unit credit at Scottish Credit and Qualifications Framework (SCQF) level 6: (6 SCQF credit points at SCQF level 6).

## Recommended entry to the unit

Entry is at the discretion of the centre. No previous knowledge or experience is required. Basic number skills are assumed.

## Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the support notes for this unit specification.

There is no automatic certification of Core Skills or Core Skill components in this unit.

# National Unit Specification: General information (continued)

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## Context for delivery

If this unit is delivered as part of a group award, it is recommended that it should be taught and assessed within the subject area of the group award to which it contributes. For example, if this unit is delivered as part of the National Progression Award in Data Science at SCQF level 6 there is overlap with other units within this award (particularly J8LW 46 Data Science) and there will be opportunities to contextualise and integrate teaching, learning and assessment across component units.

The unit may be of interest to learners who want to further develop their Information and Communication Technology (ICT) and computing skills, perhaps progressing their learning from cyber security or computer science. The unit may also be of interest to learners who wish to gain numeracy skills within a real-world setting.

Additionally, it may interest learners who are studying an area such as geography, health care, sports, or science and they wish to gain additional data literacy skills to support their studies in these other curricular areas.

This unit can be delivered stand-alone or as part of another course. For example, the Data Citizenship unit could be delivered as part of the National Progression Award in Data Science, in a digital literacy course or an additional unit in a social studies course. A wide range of examples and data visualisations can be used from a range of contexts such as business, entertainment, sports, science, health. Alternatively, the examples, case studies and visualisations can be selected from a specific context when the unit is delivered within a different course or by a subject specialist, such as delivering a land use and satellite data examples within a Geography course or using health and medical examples when delivering within a health and social care context.

More information about delivery of the unit is available in the Educator's Guide, which can be found at [NPA Data Science Data Education in Schools](#).

## Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website:

[SQA Assessment Arrangements](http://www.sqa.org.uk/assessmentarrangements) (www.sqa.org.uk/assessmentarrangements).

# National Unit Specification: Statement of standards

**Unit title:** Data Citizenship (SCQF level 6)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

## Outcome 1

Explain the use of data in society.

### Performance criteria

- (a) Explain the technological, economic and societal reasons for the growth of data.
- (b) Explain how individuals, organisations and society extract value from data.
- (c) Explain types of bias and the impact of misuse of data on individuals and society.
- (d) Explain the rights and responsibilities of organisations that use personal data.
- (e) Describe types of ethical risks that can be introduced through the use of data.
- (f) Describe methods of data security.

## Outcome 2

Explain data literacy concepts.

### Performance criteria

- (a) Explain the ways of measuring data quality.
- (b) Explain ways that data can be visualised to tell a story.
- (c) Explain the importance of domain knowledge when solving problems using data.
- (d) Explain data generated from AI in terms of quality, trust and bias

## Outcome 3

Gather data to investigate a problem.

### Performance criteria

- (a) Describe methods to gather data.
- (b) Describe best practices in survey design.
- (c) Describe ways to minimise bias when gathering data.
- (d) Design and carry out a survey to investigate a problem, ensuring bias is minimised.

# National Unit Specification: Statement of standards (continued)

**Unit title:** Data Citizenship (SCQF level 6)

## Outcome 4

Interpret complex data.

### Performance criteria

- (a) Interpret complex data visualisations to interpret patterns and trends.
- (b) Evaluate data visualisations in terms of quality, trust and bias.
- (c) Evaluate data generated from AI in terms of quality, trust and bias.
- (d) Draw conclusions from data to investigate a problem.
- (e) Make recommendations based on conclusions and communicate findings.

### Evidence requirements for this unit

Evidence is required to demonstrate that learners have achieved all outcomes and performance criteria.

Learner must provide **knowledge** and **product** evidence.

The **knowledge evidence** relates to outcome 1, outcome 2 and outcome 3 performance criteria (a–c). The knowledge evidence may be written or oral or a combination of these. Evidence can be gathered in an ‘open-book’ situation, with learners able to refer to their notes or online resources if necessary.

Evidence can be in the form of text, a poster, presentation, audio file, informal short video, or similar creative work. This can be as part of small group work, with each group member contributing to a larger piece of work such as a presentation with one slide per learner, or each group member writing bullet point notes that need to be included in a short video segment. An audience for this work could be given to the learners, such as teaching relatives or friends about biased data or giving advice to a local business about storing personal data.

The amount of evidence may be the minimum required to infer competence across outcomes, but the explanations must be sufficient to provide confidence that learners understand the required concepts. For example, in outcome 1, at least two reasons for the growth of data need to be explained (performance criterion (a)); and only a couple of data security methods need to be explained (such as limiting the data stored; backups; and access limitation) (performance criterion (f)). In outcome 2, at least two ways to measure data quality need to be explained (performance criterion (a)).

## National Unit Specification: Statement of standards (continued)

**Unit title:** Data Citizenship (SCQF level 6)

The **product evidence** relates to outcome 3 performance criterion (d) and to all of outcome 4. The knowledge evidence may be written or oral or a combination of these. The evidence must be produced by the learner with limited assistance. It may be produced in lightly controlled, open-book conditions, over an extended period of time, at times and places at the discretion of the learner. Evidence can be gathered in an 'open-book' situation, with learners able to refer to their notes or online sources if necessary. The amount of evidence may be the minimum required to infer competence across the two outcomes.

For outcome 4 performance criteria (a) and (b) learners should interpret and evaluate at least three visualisations of different types. Evidence for performance criterion (a) and (b) can either use the same visualisations throughout both of the performance criteria or different visualisations. For performance criterion (c) learners should evaluate two outputs from Generative AI tool in terms of quality, trust and bias.

The SCQF level of this unit (level 6) provides additional context on the nature of the required evidence and the associated standards. Appropriate level descriptors should be used when making judgements about the evidence.

When evidence is produced in loosely controlled conditions it must be authenticated. The guide to assessment provides further advice on methods of authentication.

The support notes section of this specification provides specific examples of instruments of assessment that will generate the required evidence.



## National Unit Support Notes

**Unit title:** Data Citizenship (SCQF level 6)

Unit support notes are offered as guidance and are not mandatory.

While the exact time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

### Guidance on the content and context for this unit

This is a mandatory unit for NPA Data Science at SCQF level 6. There is an emphasis on both the development of practical skills as well as gaining relevant knowledge and understanding.

Please note that the following guidance, relating to specific outcomes, does not seek to explain each performance criterion. It seeks to clarify the statement of standards where it is potentially ambiguous. It also focuses on non-apparent teaching and learning issues that may be over-looked, or not emphasised, during unit delivery. As such, it is not representative of the relative importance of each outcome or performance criterion.

The unit could cover the following knowledge and skills:

Knowledge	Skills
<ul style="list-style-type: none"><li>• <b>Technical reasons for growth:</b></li><li>• Easier and cheaper to collect, store, process, and analyse data. Computers are faster and more powerful, sensors are smaller and more accurate, networks are wider and faster, cloud computing has enabled access to data from anywhere; increase in AI technologies including Machine Learning (ML) and Generative AI.</li></ul>	<ul style="list-style-type: none"><li>• <b>Gather data to investigate a problem:</b></li><li>• Design and carry out a survey to investigate a problem using data gathering tools or manual data capture, ensuring bias is minimised.</li><li>• <b>Interpret complex data visualisations to interpret patterns and trends.</b></li></ul>

## National Unit Support Notes (continued)

Unit title: Data Citizenship (SCQF level 5)

Knowledge	Skills
<ul style="list-style-type: none"> <li>• <b>Economic reasons for growth:</b></li> <li>• Data is a valuable for businesses and organizations, helping improve products, services, processes, and decisions.</li> <li>• <b>Societal reasons for growth:</b></li> <li>• Access information; connect with other people through social media platforms; and help address global and community issues.</li> <li>• <b>How to extract value from data:</b></li> <li>• Better and faster decision-making, improved operations and processes, creation of a data product, understanding customer trends, creating innovative products and services. Volume, Velocity, Variety, Veracity, Vulnerability, Visualisation</li> <li>• <b>Types of bias and Impact of misuse of data</b></li> <li>• Types of bias: Statistical bias; data or sampling bias; and algorithmic bias.</li> <li>• Causes of bias: sample bias; exclusion bias; measurement bias; confirmation bias; stereotype bias; survivorship bias; Simpson's paradox; and correlation bias.</li> <li>• <b>Rights and responsibilities of organisations</b></li> <li>• GDPR Rights: Collect and use personal data for legitimate purposes; right to access, correct, or delete personal data they hold, and transfer it to other organisations.</li> </ul>	<ul style="list-style-type: none"> <li>• Read a selection of different chart types, such as: types covered in SCQF level 5 (frequency tables, dot plots, bar charts, pie charts, line graphs, stacked and grouped bar charts, bubble plots treemaps, scatter plots, heat maps, time series line graphs, and stacked area charts) as well as box plots, histograms, maps, choropleth maps, dot maps and bubble maps.</li> <li>• Describe in detail the displayed data accurately: describe what was measured; be quantitative; use descriptive vocabulary; be consistent with the data as shown; describes the variability in the data.</li> <li>• <b>Evaluate data visualisations in terms of its quality, trust and bias.</b></li> <li>• Evaluate a data visualisation: As SCQF level 5 (Graph type fits the problem; Axes visible and scaled correctly; Axes are labelled clearly; Units are given; Data plotted accurately; Legend present, if required; Graph is overall neat and legible; Title or caption present; Trend line shown, if required; Graph helps answer the question. Discuss the source of the data and creator of the visualisation.). Discuss any potential bias in how the visualisation is presented, how the data has been gathered or analysed, or bias in the source.</li> </ul>



## National Unit Support Notes (continued)

**Unit title:** Data Citizenship (SCQF level 6)

Knowledge	Skills
<ul style="list-style-type: none"> <li>• GDPR Responsibilities: Follow data protection principles and ensure personal data is: used fairly, lawfully, transparently, for specified purposes; in a relevant and limited way; accurate and up to date; kept for no longer than is necessary; and handled securely. Organisations must report data breaches. Organisations must respect the rights of individuals over their personal data, covered in SCQF level 5 (Informed, Access, Rectification, Erasure, Restrict processing, Portability, Object, Automated Decisioning).</li> <li>• <b>Ethical risks through use of data</b></li> <li>• Fairness; equality; privacy; trust and transparency; truth; health; human rights; and criminality. Give examples of ethics issues related to data; with algorithms (including AI, machine learning, and robots), or with practices (including responsible innovation, hacking).</li> <li>• <b>Methods of data security:</b></li> <li>• Limiting the data stored; backups; access limitation; testing and monitoring.</li> <li>• <b>Ways of measuring data quality:</b></li> <li>• Dimensions of data quality: completeness; uniqueness; timeliness; validity; accuracy; and consistency.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Draw conclusions from data to investigate a problem.</b></li> <li>• Can cover points from SCQF level 5 (a claim is made about what the graph shows which is consistent with the graph as drawn / shown; the reasoning is explained, is logical and supported by evidence, the interpretation should be complete and correct, and discuss several aspects of the graph, including variability). In addition, it may probe uncertainties in the data; suggest an extended reason or explanation for variability; or raise a new question.</li> <li>• <b>Make recommendations and communicate findings.</b></li> <li>• Can cover points from SCQF level 5 (Make recommendations based on data interpreted from one or more visualisations, and then Communicate findings: Present findings with an audience in mind with a purpose, such as to inform or persuade.) In addition, learners can make decisions based on patterns, trends or relationships in data, and use evidence from the interpretation of data to justify decisions.</li> </ul>

# National Unit Support Notes (continued)

Unit title: Data Citizenship (SCQF level 6)

Knowledge	Skills
<ul style="list-style-type: none"> <li>• <b>Ways that data can be visualised to tell a story:</b></li> <li>• Format / appearance of a selection of different chart types, such as: types covered in SCQF level 5 (frequency tables, dot plots, bar charts, pie charts, line graphs, stacked and grouped bar charts, bubble plots treemaps, scatter plots, heat maps, time series line graphs, and stacked area charts) as well as box plots, histograms, maps, choropleth maps, dot maps and bubble maps. Dashboards and how they gather information together to easily see important business data. Infographics gather different graph types in a more informal way to tell a story.</li> <li>• Graph choice, use of graphics, use of text, colours and position to give meaning and highlight patterns.</li> <li>• Purpose of graph: to explain, clarify, simplify, focus, gain common understanding or to drive action.</li> <li>• <b>Importance of domain knowledge when solving problems using data:</b></li> <li>• Businesses solving problems using data need not only data scientists but also domain experts who know the existing systems and processes.</li> <li>• <b>Methods to gather data.</b></li> <li>• Includes methods introduced in SCQF level 5 (Online data gathering tools and Manual data capture such as Face-to-face / telephone, postal, internet) as well as Cross-sectional, longitudinal, or retrospective.</li> </ul>	

# National Unit Support Notes (continued)

**Unit title:** Data Citizenship (SCQF level 6)

Knowledge	Skills
<ul style="list-style-type: none"> <li>• <b>Best practices in survey design:</b></li> <li>• Design; ordering; length; question type; incentives; balance; compound questions; trialling survey; simple language; avoiding answer grids; data quality; feedback; and ethics and privacy issues of gathering personal data.</li> <li>• <b>Avoiding bias when gathering data:</b></li> <li>• Sampling bias, non-response bias, response bias, order bias</li> </ul>	

**Outcome 1:** Explain the use of data in society.

This outcome allows learners to recognise the use and limitations of data in business and society. This includes the use of data for social benefit, the ethical (and unethical) use of data, such as the use of biased, false or deliberately misleading data.

A variety of real examples can be used to illustrate why data is used and has grown, but also the limitations and effect it can have on decision making in society, and the impact on individuals and organisations. The role of data in decision-making in areas like home, community, government, industry, entertainment and sport could be discussed. Learners could study examples of success stories from use of data, and examples of data disasters.

Learners should think not just their rights under GDPR but also how they can be responsible when using the internet and sharing data. They should explore more advanced data security (building on from personal data security methods in SCQF level 5) and the actions organisations should be taking in order to protect their personal data.

It is hoped that learners will get a balanced view of the use of data in society, that although bias, privacy and security can impact on individuals, there are many examples of data being used for social good and impacting positively on individuals and communities.

# National Unit Support Notes (continued)

**Unit title:** Data Citizenship (SCQF level 6)

There are lessons available online at [Learn Data Science \(https://dataschools.education/learndata\)](https://dataschools.education/learndata) covering some of the topics in this unit as well as in the Data Science unit (J8LW 46XXXX XX), such as data security, data misuse, ethical use of data, causes of bias, data quality and caring for data. The lessons come with PowerPoint presentations, lesson plans, activities in a choice of format (either Excel workbook or interactive Python notebook).

There is a Trello board of teaching resources on data and data security available at [Data Science Resources and links](#)

**Outcome 2:** Explain data literacy concepts.

This outcome is centred around data literacy for storytelling and communicating meaning to others. This would include areas such as evaluating data quality and considering when not to use or trust different sources of data, and different ways that data can be visualised to share meaning.

The ways of measuring data quality should be explored, looking at dimensions of data quality such as: completeness; uniqueness; timeliness; validity; accuracy; and consistency.

Learners should recognise that visualisations can represent different types of data and be able to justify why certain visualisations are more suitable than others for given scenarios. Learners will extract meaning from graphs and charts, including discussion about which visualisations are best for which purpose. The aspects of different types of visualisations might include the anatomy of graphs: Data (dots or bars), scales and coordinates (detailed along the x-axis and y-axis), and annotations (such as title and axis labels). Learners could also consider graph choice, use of graphics, use of text, colours and position to give meaning and highlight patterns. The purpose of graph can also be discussed: such as to explain, clarify, simplify, focus, gain common understanding or to drive action.

Data visualisations that could be explored include those in SCQF level 5 (frequency tables, dot plots, bar charts, pie charts, line graphs, stacked and grouped bar charts, bubble plots and treemaps, scatter plots, heat maps, time series line graphs, and stacked area charts) as well as box plots, histograms, maps, choropleth maps, dot maps and bubble maps. Not all of these need to be covered by learners, and other types of visualisations may be explored too, if suitable. Learners could also look at Dashboards (and how they gather information together to easily see important business data) and Infographics (which gather together different graph types in a more informal way to tell a story) as interesting ways to visualise data to tell a story.

# National Unit Support Notes (continued)

**Unit title:** Data Citizenship (SCQF level 6)

Learners should be able to interpret what different types of visualisations show as well as the limitations and possible misinterpretations. For example, the use of graphs where the axis does not begin at zero, proportions not adding up to 100%, missing data points, too many colours or segments. Factfulness 'dramatic instincts' ([Gapminder](#)) and 'Rules of Thumb' ([Gapminder](#)) could be used to help identify misleading aspects and interpret trends and patterns.

There is a Trello board of suitable data visualisation available at [Data Visualisation Examples](#) grouped by visualisation type and complexity. There is also a Trello board of 'Bad Graphs' available at [Bad Graphs](#) grouped by visualisation type and complexity. These are collated by Data Education in Schools ([Data Education in Schools](#)) and contributions from educators and learners are welcomed.

**Outcome 3:** Gather data to investigate a problem.

This outcome develops learners' understanding of surveying and data gathering. Learners will learn the advantages and disadvantages of different types of surveying methods, such as face to face, paper-based or internet based. SCQF level 6 learners should also consider Cross-sectional, longitudinal, or retrospective survey methods.

They should explore bias in survey design, including sampling bias, non-response bias, response bias and order bias. Learners should learn about best practice in survey design, such as: designing questions that meet the aim of the survey; ordering questions logically; keeping the length as short and simple as possible; focusing on closed questions; carefully wording invites and incentives; keeping answer choices balanced; avoid compound questions; trial surveys before sharing more widely; use simple, unambiguous language; avoid answer grids; aim to capture high quality data; feedback results to participants where possible; and consider ethical and privacy issues of gathering personal data.

**Outcome 4:** Interpret complex data.

This outcome is based around applying learner's knowledge of, and competency in, basic data literacy from outcome 2.

**Interpret data visualisations:**

Data visualisations that could be interpreted include those introduced at SCQF level 5 (frequency tables, dot plots, bar charts, pie charts, line graphs, stacked and grouped bar charts, and tree maps, scatter plots, heat maps, time series line graphs, and stacked area charts) as well as box plots, histograms, maps, choropleth maps, dot maps and bubble maps.

# National Unit Support Notes (continued)

**Unit title:** Data Citizenship (SCQF level 6)

Learners should describe the displayed data by stating what was measured in the visualisation. Learners should be able to read several different types of visualisations (for example, identify the name of the visualisation, interpret the axes, identifying information, look for trends). Encourage learners to be quantitative, to use descriptive vocabulary, and to be consistent with the data as shown and to describe the variability in the data.

When interpreting a visualisation, learners might comment on some of the following: the graph type fits the problem / context; the axes are visible, labelled and scaled correctly; units of measurement are given; the data is plotted accurately; there is a legend present, if required; the graph is overall neat and legible (and using accessible colours); there is a title or caption; a trend line is shown, if required; and the graph helps answer the question or contributes to the topic being investigated / discussed. Learners could discuss the source of the data and creator of the visualisation, and how much they trust the source. Learners at SCQF level 6 could also discuss any potential bias in how the visualisation is presented, how the data has been gathered or analysed, or bias in the source.

The 'I notice, I wonder, what's going on in this graph' approach ([what's going on in this graph](#)) could be taken when interpreting visualisations. This can be as part of small group discussions, such as a regular lesson starter task. Individual learners can be assessed on occasions that they are contributing sufficiently (such as commenting at each stage of the 'I notice, I wonder' process).

When evaluating graphs in terms of quality, trust and bias for performance criterion (b), the visualisations selected can be good quality graphs or 'bad graphs' where learners might have more to discuss about the poor data quality, the misleading nature of the visualisations and whether how much they trust the source.

## **Evaluate data generated from AI:**

Care should be taken to ensure the Generative AI tool selected is suitable for the age of learners taking this unit, based on the terms of use of the service. For example, OpenAI (who provide DALL-E and Chat-GPT) have a minimum age of 13 to use their tools, and people under 18 year old must have parent or legal guardian's permission to use the services ([OpenAI](#)).

# National Unit Support Notes (continued)

**Unit title:** Data Citizenship (SCQF level 6)

Suggested free tools include:

Images: [Image creator](#) (Bing Images uses DALL-E to generate images free to signed in Microsoft users. Microsoft provides an initial number of 'boosts' (currently 15) that can be used to generate images. These 'boosts' refresh over time, but the initial supply is enough to cover learning about how to use the service and carrying out the practical work required for this unit.)

Chat: [Chat](#) (which provides ChatGPT-4 free to signed in Microsoft users).

These may be available to learners using their educational Microsoft / GLOW accounts, although this depends on individual local authorities, colleges and centres allowing this functionality.

Generative AI tools are in an early stage of development yet are now commonly being used in industry and by individuals. One aspect of these systems is that there is little transparency about how they have been trained. As a result, there is a chance that unsuitable or upsetting content might be generated. It is advised that centres and educators discuss child protection and online safety with learners, and procedures to follow if learners encounter material online that upset or concern them.

An alternative to using AI tools 'live', or if learners do not have access to Generative AI tools, then text or art created using AI tools could be supplied to the learners, along with the prompts used to create the results.

## **Carry out a survey, draw conclusions and communicate findings:**

Learners will design and carry out a survey to investigate a problem using data gathering tools or manual data capture. They can then use visualisations from the survey (such as those automatically created by tools such as Microsoft Forms and Google Forms), or use visualisations created by learners or the educator from the gathered data.

One approach is to assess the majority of outcome 3 and 4 as a whole project, where learners gather data in a survey to investigate an issue, interpret patterns using the resulting visualisations, evaluate the quality of the data (and consider how trustworthy the data might be), draw conclusions and make recommendations. It is hoped that the topic of the project chosen would be relevant to the learners interests and environment (and ideally a topic selected by the learners). The visualisation might be on a topic such as food eaten at breaktime, amount of exercise taken during the week, amount of single-use plastic being discarded in school, method of travelling to school, views on community sports provision.

# National Unit Support Notes (continued)

**Unit title:** Data Citizenship (SCQF level 6)

The assessment does not need to be a complete project if logistics are not favourable or if preferred by the educator and learners. Learners can carry out the performance criteria assessments for outcome 3 and 4 as separate topics and different visualisations, as required.

## **Draw conclusions from data to investigate a problem.**

Learners could cover points from SCQF level 5 (a claim is made about what the graph shows which is consistent with the graph as drawn / shown; the reasoning is explained, is logical and supported by evidence; the interpretation should be complete and correct, and discuss several aspects of the graph, including variability.) In addition, it may probe uncertainties in the data; suggest an extended reason or explanation for variability; or raise a new question.

Learners can present their views in oral or written form, as a document, poster, presentation, audio file, informal short video, or similar creative work. Learners should present findings with an audience in mind (such as peers, family, school management, or community) and with a purpose, such as to inform or persuade.

## **Make recommendations and communicate findings.**

Make recommendations based on patterns, trends or relationships in data interpreted from one or more visualisations (such as automatic graphs generated from survey tools or a visualisation sourced by the teacher).

Communicate findings: Present findings with an audience in mind (such as peers, family, school management, community groups, organisations, or local government) with a purpose, such as to inform or persuade. Use evidence from the interpretation of data to justify decisions.

## **Guidance on approaches to delivery of this unit**

Learners should have opportunities to examine real life examples throughout the unit. For example, they can examine a range of issues in their local area and investigate how data is used to make decisions. They could use data to examine where a new community facility could be opened or where a new school situated. They should be encouraged to consider examples from the news and to discuss these in class.

The following distribution of time is suggested.

Outcome 1: 8 hours.

Outcome 2: 8 hours.

Outcome 3: 10 hours

Outcome 4: 14 hours.



## National Unit Support Notes (continued)

**Unit title:** Data Citizenship (SCQF level 6)

With regards to the order of teaching the outcomes, it is suggested that some of outcomes 2, 3 and 4 could be delivered together. This is to allow learners the opportunity to firstly learn about a type of data visualisation then demonstrate their ability to interpret examples of that type of visualisation. Learners can then learn about other types of data visualisations before again moving onto applying these skills in outcome 4. Learners could also use the data they gather in outcome 3 with their survey for outcome 4 performance criteria (d) and (e)

### Guidance on approaches to assessment of this unit

The following are suggestions only. There may be other methods that would be more suitable to learners and the type of learner assessment activities will vary depending on the resources available.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

The product evidence requires learners to design and carry out a survey to gather data, interpret and evaluate visualisations, draw conclusions and make recommendations, and evaluate the outputs of Generative AI tools. The product evidence could be assessed through the observation of learner's activity throughout the duration of the unit and recorded in an appropriate manner, such as on an observation checklist. Such as checklist would include a brief description of the task carried out by the learner.

An alternative approach to assessment could involve the use of a portfolio, which would contain knowledge and product evidence. If this approach is taken, evidence for all performance criteria would be required. Valid artefacts would include screenshots, digital photographs, audio and video recordings, annotated presentation slides, posters etc. Some form of authentication would be required, such as a statement signed and dated by learner and assessor.

# National Unit Support Notes (continued)

**Unit title:** Data Citizenship (SCQF level 6)

## Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the evidence requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at [SQA e-Assessment](http://www.sqa.org.uk/Guide%20to%20best%20practice.pdf). (www.sqa.org.uk/Guide to best practice.pdf).

## Opportunities for developing Core and other essential skills

Learners will be provided with ample opportunity to develop the following Core Skills:

**Information and Communication Technology:** The unit provides the opportunity to use ICT and further develop digital literacy skills while exploring data and interpreting data visualisations. Depending on the types of visualisations explored, learners may have the opportunity to handle numerical and graphical information.

**Communication:** Learners will develop and practice both oral and written communication throughout this unit via individual and group exercises.

**Numeracy:** Through interpretation of data, learners will have several opportunities to develop numeracy skills throughout this unit.

**Problem Solving:** The type of activities, assignments, and assessment experienced throughout this unit will require learners to apply critical thinking, plan, organise and review and evaluate both their results and the work of others.

Opportunities within this unit to develop broader skills in the areas of enterprise, employability, sustainable development and citizenship.

- Teamwork and collaboration skills
- Communication skills
- Problem-solving skills
- Locating information skills
- Observation skills

## History of changes to unit

Version	Description of change	Date

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Unit template: February 2024

# General information for learners

**Unit title:** Data Citizenship (SCQF level 6)

This section will help you decide whether this is the unit for you by explaining what the unit is about, what you should know or be able to do before you start, what you will need to do during the unit and opportunities for further learning and employment.

This unit will introduce you to the world of data. The unit is about developing your data citizenship skills that are extremely useful in life and society. You will develop your knowledge of how to interpret data, as well as exploring how data is used in the world you live in today. It is not necessary for you to have studied data citizenship before.

Data has an increasing importance in our everyday lives, and data is used in all aspects of our society. Data can be used by organisations to increase performance and profit. Football clubs and sports teams now use data to get the best out of their players. Musicians use data to find out how their tracks are performing in different parts of the world and being shared on different social networks. Data can also be misused by organisations, such as influencing people about important topics such as climate change or the spread of diseases.

In outcome 1 you will find out about how data is used in different places such as in the community, in education, sports and leisure, music and entertainment. You will learn how data is used, why more people and organisations are using data, and how using data can bring benefits.

You will learn about how data about you is used and shared by different organisations, and their responsibilities to protect personal data, and the methods they might use to protect that data. You will consider ethical risks of using data and find out what can happen when data is misused, is biased, or unfair and unethical.

In outcome 2 you will gain a range of skills in interpreting data visualisations such as graphs and charts, and how these are used for positive and negative effects. You will find out different ways that data can be used to tell a story. You will also learn how to spot when people are trying to mislead or confuse you with 'bad graphs' and how to measure the quality of data.

In outcome 3 you will find out how to make survey questions to gather data and learn about what can happen when poor quality data is gathered, and how to avoid bias when gathering data.

In outcome 4 you will demonstrate what you have learned about different types of data visualisations by interpreting and evaluating different types of graphs. You will create a survey to gather data from your family, friends or community to investigate an issue in your local area. You will also evaluate how well Generative AI tools use data to make new text or images.

## General information for learners (continued)

**Unit title:** Data Citizenship (SCQF level 6)

<b>Knowledge</b>	<b>Skills</b>
<ul style="list-style-type: none"><li>• Technical, economic and societal reasons for growth.</li><li>• How to extract value from data.</li><li>• Types of bias and the impact of misuse of data.</li><li>• Rights and responsibilities of organisations using personal data.</li><li>• Ethical risks through use of data.</li><li>• Methods of data security.</li><li>• Ways of measuring data quality.</li><li>• Ways that data can be visualised to tell a story.</li><li>• Importance of domain knowledge when solving problems using data.</li><li>• Methods to gather data.</li><li>• Best practices in survey design.</li><li>• Avoiding bias when gathering data.</li></ul>	<ul style="list-style-type: none"><li>• Gather data to investigate a problem.</li><li>• Interpret complex data visualisations to interpret patterns and trends.</li><li>• Evaluate data visualisations in terms of its quality, trust and bias.</li><li>• Draw conclusions from data to investigate a problem.</li><li>• Make recommendations and communicate findings.</li><li>• Evaluate data generated from AI in terms of quality, trust and bias.</li></ul>

You can be assessed in a variety of ways such as writing answers to questions, making a poster or presentation, speaking to answer questions, making a short video or audio recording or working in a group with other learners.