



National Unit Specification

General information

Unit title: Data Citizenship (SCQF level 4)

Unit code: J2HN 44

Superclass: CB

Publication date: November 2019

Source: Scottish Qualifications Authority

Version: 03

Unit purpose

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

This is a **non-specialist** unit, suitable for all learners. It is particularly suitable for learners who are being introduced to the fields of data literacy and data science for the first time. No previous experience is required but a familiarity with computers is desirable. The themes in this unit follow on from the outcomes and benchmarks in Digital Literacy at levels 3 and 4 in the broad general education phase of the Scottish curriculum.

Learners will gain a basic knowledge of the growing importance of data in society, how data is used, including how data can be misused, and their rights and responsibilities. They will appreciate the concept of data quality and know about common sources of high quality public and private datasets.

Learners will gain skills in using tools and techniques to interpret data so that they can gain insights into patterns or trends in the data. They will also develop basic skills in data management and security. The focus of the unit is pre-existing, small datasets; not creating new datasets or data models.

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 J2G2 44 *Data Science* at SCQF level 4, or further develop their knowledge and skills in this area by undertaking J2HN 45 *Data Citizenship* at SCQF level 5.

National Unit Specification: General information (cont)

Unit title: Data Citizenship (SCQF level 4)

Outcomes

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

- 1 State the use of data in society.
- 2 Describe data literacy concepts.
- 3 Interpret simple data.

Credit points and level

1 National Unit credit at SCQF level 4: (6 SCQF credit point at SCQF level 4)

Recommended entry to the unit

No specific knowledge or experience is required. However, basic computer skills are assumed.

Core Skills

Achievement of this Unit gives automatic certification of the following Core Skills component:

Core Skill component	Critical Thinking at SCQF level 4
----------------------	-----------------------------------

Any opportunities to develop further aspects of Core Skills are highlighted in the Support Notes section of this Unit specification.

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 4 there is overlap with the other unit within this award (J2G2 44 *Data Science*) and there will be opportunities to contextualise and integrate teaching, learning and assessment across component units.

The Assessment Support Pack (ASP) for this unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable assessment. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard. A list of existing ASPs is available to download from SQA's website (<http://www.sqa.org.uk/sqa/46233.2769.html>).

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 www.sqa.org.uk/assessmentarrangements.

Unit title: Data Citizenship (SCQF level 4)

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.

Where evidence for outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Learners should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

State the use of data in society.

Performance criteria

- (a) State the reasons for the growth of data.
- (b) State how data is used and misused by individuals, organisations and society.
- (c) State the types of data bias and its impact on society.
- (d) State common sources of public and private data.
- (e) State the rights and responsibilities of data subjects and data owners.

Outcome 2

Describe data literacy concepts.

Performance criteria

- (a) Describe the characteristics of high quality data.
- (b) Describe how data can be analysed.
- (c) Describe types of data visualisations.
- (d) Describe simple methods of managing and securing data.

Outcome 3

Interpret simple data.

Performance criteria

- (a) Create visualisation to identify patterns and trends in the data.
- (b) Draw conclusions from data.
- (c) Make recommendations based on conclusions and communicate findings.

National Unit Specification: Statement of standards (cont)

Unit title: Data Citizenship (SCQF level 4)

Evidence requirements for this unit

Learners will need to provide evidence to demonstrate the performance criteria across all outcomes. The evidence requirements for this unit will take **two** forms.

- 1 Knowledge evidence
- 2 Product evidence

The **knowledge evidence** will relate to Outcome 1 and Outcome 2. The knowledge evidence may be written or oral or a combination of these. The amount of evidence may be the minimum required to infer competence across both outcomes. For example, in Outcome 1, only the most common sources of public and private data need be described (Performance Criterion (d)); in Outcome 2, only the main data security methods must be described (Performance Criterion (d)).

An important aspect of the evidence is the learner's correct use of language, specifically technical terminology, which must be demonstrated in their statements and descriptions.

The knowledge evidence may be sampled when testing is used. Testing must be carried out under supervised conditions and must be controlled in terms of location and time. Access to reference material is not permitted. The sampling frame, on all occasions, must include Outcome 1 and Outcome 2 (but not every performance criterion within each outcome). The sampling frame must always include Outcome 1, Performance Criterion (b) and Outcome 2, Performance Criterion (a).

The **product evidence** will relate to Outcome 3. The product evidence will take the form of a completed interpretation of a small dataset. The dataset will be supplied to the learner and must comprise at least 500 data items. The learner must create at least two appropriate visualisations from the dataset and make recommendations based on the interpretation of this dataset.

The evidence must be produced by the learner with limited assistance. It may be produced in lightly controlled conditions, over an extended period of time, at times and places at the discretion of the learner.

The SCQF level of this unit (level 4) 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 4)

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 level 4. On successful completion, it will allow progression to *Digital Citizenship* at level 5. It has a focus on learning how to interpret and compare data as well as how data use affects individuals and communities in modern society. A main focus of learning and teaching will be on developing learner's data literacy. This would involve developing the vocabulary required to describe data in various forms and the ability to utilise simple data visualisation and interpreting techniques for the purpose of presenting and discussing data. This then provides a basis to further engage with the use of data in modern society and consideration of data security and regulation.

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.

Outcome 1: State the use of data in society.

This outcome is based on the current use of data in society. This includes the use of data for social benefit, the ethical (and unethical) use of data, such as the use of false or deliberately misleading data.

A variety of real examples can be used to illustrate why data is used, but also the limitations and effect it can have on decision making in society, and the impact on individuals.

Although learners will discover sources of public and private data, they should also think about the data they generate in regards to personal data privacy, and know how to change their settings to public or private. This could include discussion of, for example, location tracking, digital surveillance or facial recognition.

Rights and responsibilities of individual data subjects and data owners could include legal rights based around the ownership of data, terms and conditions and other legal entities such as General Data Protection Regulations.

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 (cont)

Unit title: Data Citizenship (SCQF level 4)

Outcome 2: Describe data literacy concepts.

This outcome is centred around basic data literacy. This would include areas such as how to use data, when not to use different sources of data, strategies for managing and securing data, and different ways to visualise data.

Features of quality data should be examined eg, accuracy, validity, reliability, currency, timeliness, completeness. This could include learning to avoid the use of data that is out of date, inaccurate, incomplete or gathered from a small sample size.

Learners will learn simple strategies for analysing data, such as averages (including the mean, median and mode), sampling and surveying, and differentiating between qualitative and quantitative data.

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. Data visualisations that could be explored include bar charts, pie charts, scatter and bubble diagrams, box and whisker charts, infographics, word clouds, circumplex charts, heat maps, etc.

Learners should be able to interpret what different types of visualisations show as well as the limitations, weaknesses and bias different visualisations show. For example, the use of colour (eg, red/green) in visualisations can indicate 'good or bad', the use of graphs where the axis does not begin at zero, biased language and sample bias.

Strategies for keeping personal data secure might include methods such as strong passwords, facial recognition, two-factor authentication and encryption.

Outcome 3: Interpret simple data.

This outcome is based around applying learner's knowledge of, and competency in, basic data literacy from Outcome 2. This would include areas such as:

- ◆ Selecting the best type of visualisations to suit the data and the purpose
- ◆ Averages, including the mean, median and mode
- ◆ Sampling and surveying

Learners should have the opportunity to use simple data analysis tools to explore and draw conclusions from data from different sources. There is an opportunity to develop the use of learners' digital skills by creating visualisations as well as recognising when they can be used for different types of data.

Data visualisations that could be created include bar charts, pie charts, scatter and bubble diagrams, box and whisker charts, infographics, word clouds, circumplex charts, heat maps, etc.

National Unit Support Notes (cont)

Unit title: Data Citizenship (SCQF level 4)

Guidance on approaches to delivery of this unit

Keeping in mind the SCQF level of this unit, a practical hands-on approach to learning should be adopted to engage learners and to help illustrate the concepts being addressed. All practical activities should be underpinned with appropriate knowledge and scaffolding when learners commence these activities.

The actual distribution of time between outcomes is at the discretion of the centre. However, one possible approach to time distribution is as follows:

- ◆ Outcome 1: 10 hours
- ◆ Outcome 2: 10 hours
- ◆ Outcome 3: 20 hours

With regards to the order of teaching the three outcomes, it is suggested that they are delivered in order beginning with Outcome 1. This is to allow learners the opportunity to firstly develop their data literacy skills at a foundational level, before moving onto applying these newly developed skills in Outcome 3.

Guidance on approaches to assessment of this unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

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.

These outcomes can be assessed in a variety of ways. A traditional approach would involve the testing of all knowledge via a response instrument (such as a written assessment). If such an approach is adopted, it is recommended that all of the knowledge and understanding in this unit is combined into a single assessment with an appropriate pass mark. For example, an assessment comprising of 20 marks could have a pass mark of 12. It is also recommended that some of the questions combine knowledge and understanding across the relevant performance criteria. This assessment would be taken unseen under controlled conditions.

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.

Another approach to assessment would be the creation and maintenance of a portfolio (either hardcopy or electronic). The portfolio would include all of the evidence necessary to satisfy every performance criterion. 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 (cont)

Unit title: Data Citizenship (SCQF level 4)

Formative assessment could be used to assess learners' knowledge at various stages throughout the life of the unit. An ideal time to gauge their knowledge would be at the end of each outcome. This assessment could be delivered through an item bank of selected response questions, providing diagnostic feedback to learners.

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 www.sqa.org.uk/e-assessment.

Opportunities for developing Core and other essential skills

Opportunities within this unit to develop Core Skills

The Critical Thinking component of Problem Solving at SCQF level 4 is embedded in this unit. When a learner achieves the unit, their Core Skills profile will also be updated to include this component.

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 creating 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 statistical analysis and data visualisation learners will have several opportunities to develop numeracy skills throughout this unit.
- ◆ **Problem Solving:** The type of analysis, activities, assignments, and assessment experienced throughout this unit will require learners to apply critical thinking, plan and organise data analysis 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

The unit encourages the development of citizenship skills and the appropriate use of data in decision making. There are opportunities for collaborative work throughout.

History of changes to unit

Version	Description of change	Date
03	Core Skills Component Critical Thinking at SCQF level 4 embedded	18/11/19
02	Unit codes changed due to hierarchy	23/08/19

© Scottish Qualifications Authority 2019

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

Additional copies of this unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Business Development and Customer Support team, telephone 0303 333 0330.

General information for learners

Unit title: Data Citizenship (SCQF level 4)

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 science. The unit is about developing your data citizenship skills that are required in life and society. You will develop your knowledge of how to use, present and analyse 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.

You will gain a range of practical skills in creating and interpreting data visualisations such as graphs and charts, and how these are used for positive and negative effects. You will consider the ethical use of data and how it can be used to benefit society. You will learn about data privacy, how to keep data about yourself safe and secure, and about the use of your data and the rights and responsibilities you have. You will develop your ability to analyse data and how to create appropriate visual images to represent data. It is designed to be highly practical.

These skills are expected to be in high demand from employers over the coming years. You will have the opportunity to look at a range of recent, real-life examples.

Assessment could be quite a few different things. It might combine a short, written test, creating and maintaining a portfolio of your work throughout the unit, or making presentations and posters. Your teacher will let you know how you will be assessed.

There is no automatic certification of Core Skills in this unit, but you will have the opportunity to develop your information and communication technology, numeracy, communication and problem solving skills. The unit encourages the development of citizenship skills and the appropriate use of data in decision making. There are opportunities for collaborative work throughout.

You will develop your ability to analyse and present data in multiple ways. This might involve working on paper or may involve presenting data electronically. From this you will be better equipped to make comparisons and decisions when looking at data in the modern world.

From this unit, you have a number of other related units in NPA Data Science to move towards, including the *Data Science* unit at SCQF level 4 and higher level units, including *Data Science* and *Data Science: Statistics* at SCQF level 5.