



## National Unit Specification

### General information

**Unit title:** Data Skills (SCQF Level 5)

**Unit code:** J698 45

**Superclass:** CB

**Publication date:** May 2022

**Source:** Scottish Qualifications Authority

**Version:** 02 (September 2022)

### Unit purpose

The purpose of this unit is to develop learner's data literacy skills so that they have a good understanding of data and statistics commonly used in the media and daily life. The unit focuses on the data skills required for citizenship in a modern technological democracy. It is assumed that learners will have basic numeracy skills prior to commencing the unit. No previous experience of working with data is assumed.

Learners will be introduced to the importance of data and its use in decision-making. They will learn to interpret data in numerical and visual form. They will be introduced to descriptive statistics and be able to recognise the misleading use of statistics. They will learn to create models to analyse data and create visualisations from familiar datasets. Learners will also explore issues relating to data security, data bias and data privacy. They will also develop their presentation skills.

On completion of this unit, learners will have confidence in the everyday use of data and statistics. Learners may wish to progress to further studies in data science such as the National Progression Award in Data Science at SCQF Level 5.

### Outcomes

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

- 1 interpret data
- 2 analyse data
- 3 visualise and communicate data
- 4 organise and secure data

## National Unit Specification: General information (continued)

**Unit title:** Data Skills (SCQF Level 5)

### Credit points and level

1 National Unit credit(s) at Scottish Credit and Qualifications Framework (SCQF) level 5: (6 SCQF credit points at SCQF level 5).

### Recommended entry to the unit

Entry is at the discretion of the centre. No previous knowledge or experience is required. An appropriate level of numeracy is assumed.

### Core Skills

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

Core Skill component                      Critical Thinking at SCQF level 5

and

Complete Core Skill                      Information and Communication Technology at SCQF level 5

There are also opportunities to develop aspects of Core Skills which are highlighted in the Support Notes 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.

This unit is the third in a family of units relating to data skills. Learners with adequate numeracy and digital skills may undertake this unit without previous knowledge or experience of working with data.

The target cohort is school and college learners, particularly school learners. The unit may also be of interest to adult learners who wish to develop data skills prior to undertaking further studies.

The unit aims to deliver data and statistical skills that are needed in everyday life and commonly used in the media to impart information to the public.

### 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](http://www.sqa.org.uk/assessmentarrangements).

# National Unit Specification: Statement of standards

## Unit title: Data Skills (SCQF Level 5)

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

Interpret data.

#### Performance criteria

- (a) Explain the use of data for decision making and its value to individuals, groups and organisations.
- (b) Describe common data types and data categories.
- (c) Describe internal and external sources of data including public sources of data.
- (d) Perform numerical calculations on data.
- (e) Interpret numerical and visual data to identify trends and outliers.
- (f) Explain data quality including data bias.
- (g) Explain how statistics can be misrepresented.

### Outcome 2

Analyse data.

#### Performance criteria

- (a) Tidy a dataset.
- (b) Create a well-formed table from data.
- (c) Summarise a dataset using descriptive statistics.
- (d) Explain correlation including types of correlation and confounding variables.
- (e) Identify different types of growth.

### Outcome 3

Visualise and communicate data.

#### Performance criteria

- (a) Select appropriate data to visualise.
- (b) Select an appropriate visualisation.
- (c) Visualise the dataset to provide an insight into the data.
- (d) Communicate the results of the data by a presentation.
- (e) Sustain argument with relevant data.

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

**Unit title:** Data Skills (SCQF Level 5)

### **Outcome 4**

Organise and secure data.

#### **Performance criteria**

- (a) Explain the importance of data security and data privacy.
- (b) Locate, access and load data from sources.
- (c) Store data on local, network or remote storage.
- (d) Organise data logically.
- (e) Secure data using routine protections.

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

**Unit title:** Data Skills (SCQF Level 5)

### Evidence requirements for this unit

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

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

The knowledge evidence relates to explicit and implicit knowledge contained within all outcomes (Outcomes 1 to 4). Minimal evidence, required to infer competence, is acceptable. Numerical calculations (Outcome 1, performance criterion d) must include percentages, percentiles and ratios. Learners must interpret at least one numerical dataset and at least two visualisations (Outcome 1, performance criterion e).

Sampling is permissible when testing is used. The sampling frame must always include percentages, percentiles and ratios, and the interpretation of visual data. Testing must be carried out under controlled conditions in terms of location, time and supervision.

The product evidence relates to Outcomes 2, 3 and 4. It will take the form of a completed analysis of a dataset, which may be small and familiar to learners. The dataset must comprise real-world data from at least two sources. The dataset must comprise at least 100 records. The analysis will demonstrate that learners can:

- ◆ load data from two or more sources;
- ◆ tidy data;
- ◆ create at least one table from data;
- ◆ summarise the data;
- ◆ create at least two contrasting visualisations;
- ◆ store data on local, network or remote storage;
- ◆ secure data using routine protections.

The summary must include mean, mode, median, range and inter-quartile range.

The performance evidence relates to Outcome 3 (performance criteria d and e). It will take the form of a presentation of the findings from the analysis. The presentation must be done under controlled conditions and presented to at least one person. The learner must sustain an argument with data during the presentation.

The evidence may be produced over an extended period of time in loosely controlled conditions. Authentication is required when the evidence is produced in lightly controlled conditions.

The SCQF Level of this unit provides additional context relating to the quality of evidence.

## National Unit Support Notes

**Unit title:** Data Skills (SCQF Level 5)

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

The purpose of this unit is to develop learner's data literacy skills. Learners are assumed to possess basic numeracy and data skills before undertaking this unit. A familiarity with spreadsheet software is desirable.

This unit is the third in a family of units that relate to data skills. It is designed for learners who wish to develop their pre-existing data skills, although it may be undertaken by learners with little prior experience of working with data.

The focus of the unit is breadth, rather than depth, so the treatment of any single topic should be light. For example, when discussing how statistics can be misleading (Outcome 1), only the most common ways of misrepresenting statistical data should be explored; the identification of types of growth (Outcome 2) should involve no more than the recognition of linear, logarithmic and exponential growth; routine data protections (Outcome 4) should be limited to simple protections such as backups and password protection.

Depending on the age of learners, the importance of privacy (Outcome 4) may need to be carefully explained. The potential conflict between data collection and privacy rights should be explored.

The unit will cover the following knowledge and skills.

#### Knowledge

- ◆ Value of data.
- ◆ Data thinking.
- ◆ Data for decision making.
- ◆ Qualitative and quantitative data.
- ◆ Types of data: nominal, ordinal, discrete, continuous.
- ◆ Data sources (internal and external).
- ◆ Data quality including data bias.
- ◆ Types of bias including confirmation bias.
- ◆ Data storage and data organisation.

#### Skills

- ◆ Interpret complex graphs and charts and identify trends.
- ◆ Calculate percentages, ratios and percentiles.
- ◆ Calculate mean, mode and median.
- ◆ Calculate range and IQR.
- ◆ Summarise small datasets using descriptive statistics.
- ◆ Access data sources.
- ◆ Locate and load data from data sources.

## National Unit Support Notes (continued)

**Unit title:** Data Skills (SCQF Level 5)

### Knowledge

- ◆ Data formats including CSV.
- ◆ Data security and data privacy.
- ◆ Percentages, ratios and percentiles.
- ◆ Measures of central tendency: mean, median and mode, and when to use each.
- ◆ Measures of dispersion: range and IQR.
- ◆ Frequency tables.
- ◆ Types of growth including exponential.
- ◆ Trends and outliers.
- ◆ Concept of correlation, types of correlation, confounding variables.
- ◆ Misleading statistics.
- ◆ Spreadsheet models.
- ◆ Value of visualisation.
- ◆ Types of graphs and charts.

### Skills

- ◆ Use spreadsheet software.
- ◆ Clean datasets.
- ◆ Create spreadsheet models.
- ◆ Construct frequency tables.
- ◆ Select graphs and charts.
- ◆ Create visualisations.
- ◆ Presentation skills.
- ◆ Use data to sustain argument and justify recommendations.

A vital outcome for this unit is that learners begin to develop “data thinking” when making decisions or innovating.

Any appropriate software can be used during this unit, although it is anticipated that most learners will use spreadsheet software.

### Guidance on approaches to delivery of this unit

Outcomes 1, 2 and 3 are best delivered in sequence. Outcome 4 (relating to data security) should be delivered in the context of the earlier outcomes. This would allow learners to develop their understanding of data, its uses, and value before developing knowledge and skills in statistics and summarising data, and finally creating visualisations. Outcome 4 (data security) would be introduced at various points throughout the unit.

The following distribution of time is suggested.

Outcome 1	10 hours
Outcome 2	15 hours
Outcome 3	10 hours
Outcome 4	5 hours

Tasks should be designed to take a learner-centred, participative, and practical approach. At this level, learners would work with small datasets, such as data relating to the top-rated 100 movies.

It is encouraged to use interesting datasets that will engage learners such as those relating to the school (or college) or a favourite sports team.

## National Unit Support Notes (continued)

### Unit title: Data Skills (SCQF Level 5)

For example, concepts such as central tendency and dispersion (measured by mean, median, mode, range and IQR in this unit) can be exemplified by exploring the various football leagues in Europe to determine the most competitive league (based on these descriptive statistics).

### 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 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.

A traditional approach to assessment might involve the use of a test (for knowledge evidence), a practical assignment (for product evidence), and observation of a presentation (for performance). The test could take the form of a selected response test, comprising 30 questions, with an appropriate pass mark. The practical exercise would require learners to analyse a small dataset, created from two data sources. The presentation would involve learners presenting their findings to their teacher.

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. Separate performance evidence will be required.

### 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](http://www.sqa.org.uk/e-assessment).

### Opportunities for developing Core and other essential skills

This unit provides opportunities to develop Core Skills, particularly ICT and Numeracy (at SCQF Level 5).

The unit covers a wide range of competences relating to Using Graphical Information, such as interpreting information from tables and communicating information using graphs and charts. Using Number competencies, such as working confidently to solve a numerical problem, are also included in the unit.



## National Unit Support Notes (continued)

### Unit title: Data Skills (SCQF Level 5)

The unit covers a wide range of competencies relating to Accessing information, such as making effective, independent and responsible use of ICT. It also covers a range of specific skills relating to Providing/Creating Information, such as locating and integrating data from a range of sources.

The Critical Thinking component of Problem Solving at SCQF level 5 is embedded in this unit. When a learner achieves the unit, their Core Skills profile will also be updated to include this component.

The Core Skill of Information and Communication Technology SCQF level 5 is also embedded in this unit. When a learner achieves the unit, their Core Skills profile will also be updated to include this Core Skill.

## History of changes to unit

Version	Description of change	Date
02	Core Skills Component Critical Thinking at SCQF level 5 and Core Skill Information and Communication Technology at SCQF level 5 are embedded.	13/09/2022

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Unit template: June 2017.

## General information for learners

### Unit title: Data Skills (SCQF Level 5)

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.

The Critical Thinking component of Problem Solving at SCQF level 5 is embedded in this unit. When you achieve the unit, your Core Skills profile will also be updated to include this component.

The Core Skill of Information and Communication Technology at SCQF level 5 is also embedded in this unit. When you achieve the unit, your Core Skills profile will also be updated to include this Core Skill.

This unit is designed to improve your data skills so that you understand the data and statistics commonly used in the media and daily life. No previous knowledge of data is assumed, however basic numeracy and digital skills would be beneficial.

The unit has four outcomes covering interpreting data, analysing data, visualising and communicating data, and organising and securing data.

In Outcome 1 you will learn about the use of data for decision making, sources of data, data quality and biases, and data types and formats.

In Outcome 2 you will learn about data statistic concepts including misleading statistics, locating, loading and cleaning datasets, using software to analyse datasets, and interpreting graphs and charts to identify trends.

In Outcome 3 you will learn about graphs and charts, create visualisations, make recommendations from the summaries and visualisations, and communicate your recommendations.

In Outcome 4 you will learn about the storage and organisation of data while taking account of issues relating to data security and privacy.

The unit covers the following knowledge and skills.

#### Knowledge

- ◆ Value of data.
- ◆ Data thinking.
- ◆ Data for decision marking.
- ◆ Qualitative and quantitative data.
- ◆ Types of data: nominal, ordinal, discrete, continuous.
- ◆ Data sources (internal and external).
- ◆ Data quality including data bias.
- ◆ Types of bias including confirmation bias.
- ◆ Data storage and data organisation.
- ◆ Data formats including CSV.

#### Skills

- ◆ Interpret complex graphs and charts and identify trends.
- ◆ Calculate percentages, ratios and percentiles.
- ◆ Calculate mean, mode and median.
- ◆ Calculate range and IQR.
- ◆ Summarise small datasets using descriptive statistics.
- ◆ Access data sources.
- ◆ Locate and load data from data sources.
- ◆ Use spreadsheet software.

- ◆ Data security and data privacy.
- ◆ Percentages, ratios and percentiles.
- ◆ Measures of central tendency: mean, median and mode, and when to use each.
- ◆ Clean datasets.
- ◆ Create spreadsheet models.
- ◆ Construct frequency tables.
- ◆ Select graphs and charts.
- ◆ Create visualisations.

Validated

## General information for learners (continued)

**Unit title:** Data Skills (SCQF Level 5)

### Knowledge

- ◆ Measures of dispersion: range and IQR.
- ◆ Frequency tables.
- ◆ Types of growth including exponential.
- ◆ Trends and outliers.
- ◆ Concept of correlation, types of correlation, confounding variables.
- ◆ Misleading statistics.
- ◆ Spreadsheet models.
- ◆ Value of visualisation.
- ◆ Types of graphs and charts.

### Skills

- ◆ Presentation skills.
- ◆ Use data to sustain argument and justify recommendations.

You can be assessed in a variety of ways which may include a multiple-choice test of your knowledge. A series of practical exercises could involve you using spreadsheet software to locate, store, protect, load, tidy, summarise and visualise data using graphs and charts, and make conclusions and recommendations from the data. You could present your recommendations supported by data.