National Unit Specification

General information

Unit title: Data Skills (SCQF Level 4)

Unit code: J698 44

Superclass:	**CB**
Publication date:	May 2022
Source:	Scottish Qualifications Authority
Version:	02 (September 2022)

Unit purpose

The purpose of this unit is to introduce learners to the basics of working with data so that they understand data and statistics commonly used in the media and daily life. No previous knowledge or experience of data is assumed, although it is assumed that learners will be familiar with computing devices. Learners should possess basic numeracy skills; however, these will be further developed during the unit.

Learners will be introduced 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 basic statistics and be able to recognise when statistics are used to mislead. They will learn to create simple models to analyse small, familiar datasets and create simple visualisations. Learners will also explore issues relating to data security and data bias.

On completion of this unit, learners will have developed their data literacy and statistical literacy skills, sufficient to understand data as it is commonly presented in the media. Learners may wish to progress to J698 45Data Skills at SCQF Level 5.

Outcomes

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

1 interpret data
2 summarise data
3 visualise data
4 store and protect data

National Unit Specification: General information (continued)

Unit title: Data Skills (SCQF Level 4)

Credit points and level

1 National Unit credit(s) at Scottish Credit and Qualifications Framework (SCQF) level 4: (6 SCQF credit points at SCQF level 4).

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

Core Skill component   Critical Thinking at SCQF level 4

and

Complete Core Skill   Information and Communication Technology at SCQF level 4

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 second unit in a family of units relating to data skills. It may be the learner's first exposure to formal data skills. Although a familiarity with computing devices is assumed, it is not assumed that learners will have 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.

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**.

National Unit Specification: Statement of standards

Unit title: Data Skills (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.

Outcome 1

Interpret data.

Performance criteria

(a) Describe the value of data to individuals and groups.
(b) Explain how data is used for decision making.
(c) State common data types.
(d) Identify internal and external sources of data.
(e) Perform simple numerical calculations on data.
(f) Interpret numerical and visual data.
(g) Identify trends in data.
(h) Identify bias and misleading statistics.

Outcome 2

Summarise data.

Performance criteria

(a) Tidy data to remove errors and duplicates.
(b) Create a well-formed table from data.
(c) Summarise a small dataset.
(d) Identify correlation in data.
(e) Distinguish between correlation and causation.
(f) Draw a valid conclusion from data.
(g) Make a decision based on a summary of data.

Outcome 3

Create graphs and charts.

Performance criteria

(a) Select appropriate data to visualise.
(b) Select an appropriate graph or chart.
(c) Create a graph or chart to illustrate data.
(d) Format a graph of chart to improve clarity.

National Unit Specification: Statement of standards (continued)

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Outcome 4

Store and protect data.

Performance criteria

(a) Load data from a local source.
(b) Store data on local, network or remote storage.
(c) Organise data logically.
(d) Describe common threats to data security.
(e) Secure digital data using simple protections.

National Unit Specification: Statement of standards (continued)

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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 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 e) must include percentages and ratios. Learners must interpret at least one numerical dataset and at least two visualisations (Outcome 1, performance criterion f).

Sampling is permissible when testing is used. The sampling frame must always include percentages 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 analysis will demonstrate that learners can:

♦ load data from a local source;
♦ tidy data to remove errors and duplicates;
♦ create at least one table from data;
♦ summarise the data;
♦ create and format at least one graph or chart from the data;
♦ draw a conclusion and make a decision from the data;
♦ store data on local, network or remote storage;
♦ secure data using simple protections.

The summary must include mean, mode, median and range.

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 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

The purpose of this unit is to introduce learners to the basics of working with data. There is no previous knowledge or experience required, although a familiarity with computer hardware and software, together with basic numeracy skills, are assumed.

This unit is the second in a family of units that relate to data skills. It is designed for learners with little, or no, pre-existing data skills and limited numerical skills. A significant part of this unit will involve the development of number skills such as calculating percentages and rounding numbers. Although software will be used for these calculations, it is recommended that learners are able to perform these calculations on paper.

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

Given the level of this unit, a minimalist approach should be taken to the performance criteria. For example, "common data types" (Outcome 1, PC c) should be limited to basic data types such as number, text, date and time. Similarly, the treatment of data bias (Outcome 1, PC h) and misleading statistics should be limited to the most common sources of bias and the most obvious methods of misleading people with statistics (such as moving the x-axis in a visualisation).

The unit will cover the following knowledge and skills.

Knowledge

- ♦ Uses and value of data in various contexts. Thinking in terms of data.
- ♦ Data for decision making.
- ♦ Types of data.
- ♦ Sources of data (internal and external).
- ♦ Data bias.
- ♦ Data storage including units of capacity.
- ♦ Data organisation.
- ♦ Data protection.
- ♦ Percentages and ratios.

Skills

- ♦ Interpret simple graphs and charts.
- ♦ Calculate percentages and ratios.
- ♦ Calculate mean, median and mode.
- ♦ Calculate range.
- ♦ Summarise small datasets using descriptive statistics.
- ♦ Access data sources.
- ♦ Store and organise data.
- ♦ Protect data.
- ♦ Use spreadsheet software.

National Unit Support Notes (continued)

Unit title: Data Skills (SCQF Level 4)

Knowledge

♦ Measures of central tendency: mean, median and mode, and when to use each.
♦ Measures of dispersion: range.
♦ Concept of correlation.
♦ Correlation and causation.
♦ Misleading statistics.
♦ Spreadsheet models including functions and formulas.
♦ Type of graphs and charts.
♦ Trends in data.

Skills

♦ Locate and load data.
♦ Tidy small datasets.
♦ Create simple spreadsheet models.
♦ Select graphs and charts.
♦ Create simple graphs and charts.
♦ Draw conclusions from data.
♦ Make decisions from data.

Care must be taken with the level of treatment of any one topic. For example, in Outcome 2, learners are required to identify correlations in data (PC d). It is sufficient for learners to simply recognise that two datasets are related ("going up" or "going down"); there is no expectation that learners understand the concept of positive or negative correlation. Similarly, in Outcome 4, learners are required to describe common threats to data security (PC d). Only the most obvious, common threats (such as data loss) are expected.

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, local, familiar datasets, such as data relating to sports teams in a sports league. However, small does not mean a trivial number of records. For example, a dataset relating to sports teams comprising 25 records would be appropriate.

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. For example, concepts such as central tendency and dispersion (measured by mean, median, mode and range 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).

National Unit Support Notes (continued)

Unit title: Data Skills (SCQF Level 4)

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) and a practical exercise (for product evidence). The test could take the form of a selected response test, comprising 25 questions, with an appropriate pass mark. The practical exercise would require learners to analyse a small, supplied dataset (such as one relating to class members).

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.

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

This unit provides opportunities to develop Core Skills, particularly ICT and Numeracy (at SCQF Level 4).

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

The unit covers a wide range of competencies relating to Accessing information, such as selecting relevant information. It also covers a range of specific skills relating to Providing/Creating Information, such as presenting information in an appropriate format.

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.

The Core Skill of Information and Communication Technology SCQF level 4 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 4 and Core Skill Information and Communication Technology at SCQF level 4 are embedded.	13/09/2022

General information for learners

Unit title: Data Skills (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.

The Critical Thinking component of Problem Solving at SCQF level 4 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 4 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 provides a basic introduction to data literacy. It has four outcomes covering interpreting data, summarising data, creating graphs and charts, and store and protect data.

In Outcome 1 you will learn about the uses and value of data, the different types of data, internal and external sources of data, and finally data bias.

In Outcome 2 you will learn about basic statistical methods, including misleading statistics, accessing, extracting and cleaning small datasets, and use spreadsheet software to summarise datasets.

In Outcome 3 you will learn about types of graphs and charts, to create simple visualisations, and identify trends in data from graphs and charts.

In Outcome 4 you will learn about storing data including data organisation and data protection.

The unit covers the following knowledge and skills.

Knowledge

- Uses and value of data in various contexts. Thinking in terms of data.
- Data for decision making.
- Types of data.
- Sources of data (internal and external).
- Data bias.
- Data storage including units of capacity.
- Data organisation.
- Data protection.
- Percentages and ratios.
- Measures of central tendency: mean, median and mode, and when to use each.
- Measures of dispersion: range.
- Concept of correlation.
- Correlation and causation.

Skills

- Interpret simple graphs and charts.
- Calculate percentages and ratios.
- Calculate mean, median and mode.
- Calculate range.
- Summarise small datasets using descriptive statistics.
- Access data sources.
- Store and organise data.
- Protect data.
- Use spreadsheet software.
- Locate and load data.
- Tidy small datasets.
- Create simple spreadsheet models.
- Select graphs and charts.
- Create simple graphs and charts.
- Draw conclusions from data.

- Misleading statistics.
- Spreadsheet models including functions and formulas.
- Type of graphs and charts.
- Trends in data.

- Make decisions from data.

General information for learners (continued)

Unit title: Data Skills **(**SCQF Level 4**)**

You can be assessed in a variety of ways, which may include a short test of your knowledge and a series of practical exercises that could involve you using spreadsheet software to locate, store, protect, load, tidy, summarise and visualise data using simple graphs and charts, and making conclusions and recommendations from the data.