Higher National Unit Specification

General information

Unit title: Communicating with Data (SCQF level 7)

Unit code: J4Y5 34

Superclass: CA

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Version: 02

Unit purpose

The purpose of this unit is to provide an introduction to the communication and visualisation of data. It is complimentary to J4Y4 34 *Working with Data* at SCQF level 7.

This is a **non-specialist** unit, suitable for a wide range of learners. It is suitable for learners who wish to understand how to communicate the results of data analysis to facilitate data-driven decision-making. No previous experience of interpreting or creating data visualisation is required. However, learners should possess numeracy skills.

Learners will develop practical skills in the design and creation of a range of data visualisations and learn how to interpret visualisations created by others. They will learn to select visualisations for different datasets and learn techniques for communicating data effectively and accurately. Data ethics, as it applies to data communication, will also be introduced. During the unit, learners will use data visualisation software to create a variety of visual representations of data to provide insights and tell stories.

On completion of this unit, learners will be able to describe suitable forms of data communication for simple types of data, explain what makes effective data communication, prepare data for visualisation, interpret visualisations created by others, design and create data visualisations, and identify when information is presented is a misleading manner.

Learners may progress to J4Y6 35 *Working with Data* and J4Y7 35 *Communicating Data* at SCQF level 8.

Higher National Unit Specification: General information (cont)

Unit title: Communicating with Data (SCQF level 7)

Outcomes

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

1 Interpret a range of data visualisations.
2 Explain the features of effective data communication.
3 Create a range of data visualisations to provide insights.

Credit points and level

1 Higher National Unit credit at Scottish Credit and Qualifications Framework (SCQF) level 7: (8 SCQF credit points at SCQF level 7)

Recommended entry to the unit

Learners should have experience of data preparation and data analysis and know the basic types of data (numerical and categorical). This knowledge and experience may be evidenced by completion of, or progress in, J4Y4 34 *Working with Data* at SCQF level 7, which complements this unit.

Learners should possess numeracy skills, which may be evidenced by possession of the Core Skills unit in *Numeracy* at SCQF level 6 (F3GF 12).

It would also be beneficial if learners possessed IT skills, which may be evidenced by possession of the Core Skills unit in *Information and Communication Technology (ICT)* at SCQF level 6 (F3GC 12). No previous experience of interpreting or creating data visualisations, or of programming, is required.

Core Skills

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

Core Skill component	Critical Thinking at SCQF level 5
Complete Core Skill	Information and Communication Technology at SCQF level 6

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 complimentary to J4Y4 34 *Working with Data* at SCQF level 7, which focuses on the analysis of data. As such, it is recommended that teaching, learning and assessment are combined with that unit when possible.

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**.

Higher National Unit Specification: Statement of standards

Unit title: Communicating with Data (SCQF level 7)

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

Interpret a range of data visualisations.

Knowledge and/or skills

- Evolution of the visual representation of data
- Purpose of communicating with data
- Types of data
- Forms of data communication including summaries, charts, infographics, dashboard and storytelling
- Types of data visualisation
- Data quality
- Key elements of a data visualisation including terminology and graphical conventions
- Extraction of meaning from a data visualisation
- Significance of domain knowledge

Outcome 2

Explain the features of effective data communication.

Knowledge and/or skills

- Design considerations
- Selection of visualisations
- Data dashboards and data storytelling
- Facilitating understanding using appropriate representation and presentation
- Misleading representations
- Data bias and ways to reduce bias
- Ethical considerations

Higher National Unit Specification: Statement of standards (cont)

Unit title: Communicating with Data (SCQF level 7)

Outcome 3

Create a range of data visualisations to provide insights.

Knowledge and/or skills

- Preparing data for visualisation
- Identifying key performance indicators
- Designing effective data visualisations
- Matching visualisation to audience
- Creating visualisations using software
- Creating dashboards and reports

Evidence requirements for this unit

The evidence requirements for this unit will take **two** forms:

1 Knowledge evidence
2 Product evidence

Knowledge evidence relates to outcome 1 and outcome 2. Knowledge evidence is required for **all** knowledge and/or skills statements in these outcomes. The evidence may be produced over an extended period of time in lightly controlled conditions. The amount of evidence will be the **minimum** required to infer competence.

The knowledge evidence may be sampled when testing is used. In this case, the evidence must be produced under controlled conditions in terms of location, timing and access to reference materials. The sampling frame must include both outcomes (at least partially) and the majority of knowledge/skills statements (in each outcome). The sampling frame must always include the following:

- Types of data visualisation
- Data quality
- Key elements of a data visualisation
- Extraction of meaning from a data visualisation
- Misleading representations

The knowledge evidence may be written or oral, or a combination of both. Evidence may be captured, stored and presented in a range of media (including audio and video) and formats (analogue and digital). Particular consideration should be given to digital formats.

Higher National Unit Specification: Statement of standards (cont)

Unit title: Communicating with Data (SCQF level 7)

Knowledge evidence will consist of:

- The interpretation of **at least three** data visualisations that meet the following criteria:
  - one of the visualisations must be a dashboard
  - include visualisations for both numerical and categorical data
- Demonstrating an awareness of the features of **at least two** data visualisations that are deliberately misleading. The learner will demonstrate that they can:
  - identify the misleading features
  - describe at least one implication of the misleading visualisation

The data visualisations used to gather knowledge evidence should allow learners to fully satisfy the evidence requirements stated above. This should be achieved by either providing learners with **at least five** visualisations (three visualisations for interpretation and two misleading visualisations) or combining visualisations, so long as these amount to **at least three** visualisations. Where the latter option is implemented, the visualisations must contain enough data to allow learners to fulfil all of the evidence requirements defined above.

Product evidence relates to outcome 3. The product evidence will consist of **at least three** data visualisations, produced from supplied, familiar, non-complex datasets, which meet the following criteria:

- one of the visualisations must be a dashboard
- include visualisations for both numerical and categorical data
- demonstrate that an appropriate form of visualisation has been selected for the intended purpose and audience, and the data
- demonstrate appropriate graphical choices such as structure, aesthetics, annotations
- follow graphical conventions
- each visualisation should be accompanied by one or more statements that describe insights that the learner intends the target audience to take away from the visualisation

The product evidence may be generated in supervised or unsupervised conditions with access to learning materials. When evidence is produced in loosely controlled conditions, it must be authenticated. The *Guide to Assessment* provides further advice on methods of authentication.

There are no time limitations on the production of evidence. The evidence may be produced at any time during the life of the unit.

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

The *Guidelines on approaches to assessment* (see the support notes section of this specification) provides specific examples of instruments of assessment.

Higher National Unit Support Notes

Unit title: Communicating with Data (SCQF level 7)

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 unit provides an introduction to data communication for learners who have little or no experience of the interpretation or creation of data visualisations. Its focus is on how to 'read' and make sense of the information contained in data visualisations and in the development of practical skills that enable the results of data analysis to be communicated to others in ways that are accurate, trustworthy, accessible and useful. The focus of the unit is on data visualisation as a tool to communicate to others. Therefore, data visualisation used by an analyst to better understand the data in a personal capacity during Exploratory Data Analysis will not be covered in this unit.

This unit complements unit J4Y4 34 *Working with Data* at SCQF level 7. The purpose of J4Y4 34 *Working with Data* at SCQF level 7 is to develop skills to extract, clean and transform data and undertake simple analysis on it. This unit may be used after the completion of Working with Data to demonstrate how to communicate the results of data analysis. It may also be delivered alongside *Working with Data*. If this option is chosen there are dependencies between the units which will determine the order of teaching certain topics. These are described in the *Guidance on approaches to delivery of this unit* section below.

Outcome 1 — Interpret a range of data visualisations.

Learners should be provided with a brief introduction as to how data visualisation has evolved over time from the early inventors (Playfair/Nightingale/Minard/Snow) through more recent innovators (Tufte/Wilkinson) to modern-day examples. The purpose of this introduction is to show that people have found data visualisation valuable for hundreds of years, and that, whilst new types of visualisations are being created all the time, the 'core' charts have stood the test of time.

Learners could be introduced to the topic of the interpretation of data visualisations through their use in the media and in current affairs. Data visualisation is increasingly common-place and the need to be able to interpret charts and other forms of data visualisation is becoming increasingly important for us as individuals, consumers and informed citizens.

Higher National Unit Support Notes (cont)

Unit title: Communicating with Data (SCQF level 7)

Learners will be introduced to how data communication is used to enable individuals and organisations make informed decisions in a variety of domains such as business, science and sport. It may be possible to find examples that match the interests and/or experience of the learners. For a variety of domains, examples should be given of the kinds of questions that can be answered by using data visualisations, eg what is it telling you? Additionally, examples should be given of how data visualisations can *prompt* questions which invite further investigation and ultimately better decision-making.

The place of data communication in a data science process should be made explicit, with a particular focus on the relationship between data analysis and data communication.

It should be demonstrated to learners how the human brain can spot patterns, trends and outliers in a data visualisation more easily than in a table containing 'raw' numbers. This should be done, preferably, in a practical manner.

Learners should be exposed to a number of good examples from each of the following forms of data communication:

- **Summaries** — learners should be exposed to descriptive statistics which summarise data in a single number, eg measures of central tendency for continuous data or proportions/percentages for discrete data. The advantages and limitations of summarising data using a single number should be explored.
- **Infographics** — a distinction should be made between infographics and charts; infographics may include charts but also typically include other graphical design elements such as illustrations, photographs and diagrams, as well as textual information. They tend to be design-focused, static and commonly used in a marketing context.
- **Dashboards** — at the time of writing, dashboards are a popular means to communicate data in a business context, particularly for data which relates to Key Performance Indicators (KPIs). They typically comprise multiple summary statistics and charts, and are often interactive, enabling the data to be explored. Learners should be exposed to examples of dashboards used within different business functions.
- **Charts** — the term 'chart' is used synonymously with 'graph' or 'plot', ie graphic representations of data. The charts that should be included in this unit are **bar charts** (and their sub-types — horizontal/vertical, stacked and grouped), **histograms**, **scatter plots** and **line charts**. Charts which show two-dimensional data on two axes are adequate — there is no requirement to demonstrate charts which show more than two axes. A brief examination of visualising dimensions beyond two dimensions (eg using colour, shape, size, facets or animation) may be desirable. An example of a scatter plot which uses size and colour to visualise four dimensions can be found on the Gapminder website. Pie charts could be included as examples of charts which are commonly used (often badly) but which have a better alternative.
- **Storytelling** — by 'storytelling' I'm referring to the construction of a verbal/written narrative structure which complements one or more data visualisations in order to make the 'message' conveyed by the visualisation(s) more compelling.

Higher National Unit Support Notes (cont)

Unit title: Communicating with Data (SCQF level 7)

The recommended distribution of time which is devoted to each form of data communication within this unit is as follows:

- Summaries — 5%
- Infographics — 5%
- Dashboards — 10%
- Charts — 70%
- Storytelling — 10%

For each chart type, learners should know the names and purposes of the key elements of the chart, eg title, axes, labels, and legend. They should be able to use the correct terminology and be able to identify which elements are required to make the chart meaningful, as well as identify what data that is ready to be communicated look like. Learners should appreciate the role of graphical conventions (eg numbers on axes starting at zero, or tick marks being spaced at regular intervals) in making charts easier to consume.

Learners should be able to assess a simple dataset and identify the steps necessary to prepare it for visualisation. The skills required to do this are covered in J4Y4 34 *Working with Data* at SCQF level 7.

Outcome 2 — Explain the features of effective data communication.

Learners should be aware of the various aspects of design that facilitate effective data visualisation, namely the choice of data, structure (eg co-ordinate system and scales), annotations and aesthetics (eg colour and shape).

Learners should explore how bad design choices impede understanding and good design choices facilitate it.

Learners should be able to select an appropriate form of data communication based on the goal of the communicator, the purpose of the communication, the intended audience, the method of consumption (eg will it be delivered in person to the audience or will it be embedded within a written document?). Learners should select from summary, infographic, dashboard, or chart. For this unit, the focus should be on charts and dashboards, in that order.

When a chart is selected as the appropriate form of communication, learners should be able to select the appropriate representation (ie chart type) for the type of data being visualised.

In terms of audience awareness, learners should be aware that consideration needs to be given to what they want to get as recipients of the communication, what their experience of data visualisation is, and what their needs are (eg accessibility needs such as colour blindness).

Learners should be exposed to a range of examples of misleading charts, including those which are purposefully misleading and those which are simply badly designed. Problematic pie charts (eg those with many segments, or angled 3D pie charts where the area of each segment is difficult to determine) could be included here. Learners should have the opportunity to identify what elements of the charts causes them to be misleading, and what the creator of the chart would need to do to address the issue(s).

Learners will learn about data bias and should have the opportunity to explore the reasons why some people deliberately create misleading charts ('to influence others') and what the ethical implications of doing so are. Examples could be drawn from politics or marketing, amongst others. Learners should also explore ways in which bias could be reduced. As a corollary, learners should have the opportunity to explore why it is important to produce data visualisations which are accurate and trustworthy.

Outcome 3 — Create a range of data visualisations to provide insights.

Using the skills developed via outcome 1 and outcome 2, learners should be able to select an appropriate visualisation to be created, based on the goals and purpose of the communication, the audience and the data, and make appropriate design choices about this visualisation. It would be beneficial if a variety of contexts and purposes were contrived for the creation of the visualisations. Learners should be able to undertake simple data preparation to ensure the data is ready for visualisation.

The choice of software used to create the visualisations is left to the discretion of the centre or learner, but should not require programming.

Using a software package, learners should create the following charts from a variety of simple datasets: **bar charts** (and their sub-types — horizontal/vertical, stacked and grouped), **histograms**, **scatter plots** and **line charts**. Using a software package, learners should create **at least one** dashboard.

Using what they have learned in outcome 2 regarding effective data communication, learners should be able to evaluate what they have produced, and take remedial action to address any issues, before communicating the insights obtained from their visualisations.

At the time of writing, Tableau is the market-leading data visualisation software package, and offer free one-year licences to students at accredited academic institutions. Other popular packages include FusionCharts, Datawrapper and Excel. Tableau, FusionCharts and Datawrapper can be used to create dashboards as well as charts. None of these packages require programming.

Guidance on approaches to delivery of this unit

Where this unit is delivered alongside J4Y4 34 *Working with Data* at SCQF level 7, learners should have demonstrated the ability to extract, clean and transform data in the Working with Data unit prior to starting activities relating to outcome 2 and outcome 3 in this unit. Outcome 1 is independent of the *Working with Data* unit.

A suggested order of delivery is as follows. Outcomes should be delivered in a sequential order. Therefore, outcome 1 should be undertaken first as it provides the foundations upon which the other outcomes will be built and demonstrates the range of data visualisations that will be created in outcome 3 and the key elements of these visualisations.

Outcome 2 should be delivered after outcome 1 as it also relates to the **interpretation** of visualisations. Finally, outcome 3 relates to the **creation** of visualisations and should be delivered last.

Higher National Unit Support Notes (cont)

Unit title: Communicating with Data (SCQF level 7)

A suggested distribution of time across the outcomes is:

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

Both the interpretation and creation of data visualisations lend themselves to practical activities, so it is therefore suggested that as much of the delivery as possible is of a practical nature. For the interpretation of visualisations (outcomes 1 and 2) it would be beneficial if a large proportion of visualisations were derived from real data. There are many visualisations openly available across a large number of domains which could be used for this purpose, as well as open datasets which could be used to create visualisations for learners to interpret.

Some suggestions for activities and resources related to all of the outcomes follow.

Outcome 1

Examples of data visualisation in the media and current affairs can be found at The Guardian, The New York Times, chartr, Information is Beautiful and FiveThirtyEight.

Column Five Media and Information is Beautiful both host good examples of infographics. Albert Cairo's The Functional Art and The Truthful Art are useful reference books.

Geckoboard provides examples of corporate dashboards.

Claus O. Wilke's Fundamentals of Data Visualization is a useful reference e-book and Andy Kirk's Data Visualisation: a Handbook for Data Driven Design is a comprehensive guide to data visualisation which contains an extremely useful guide to all of the major types of charts currently in use.

For the use of storytelling in data communication, Cole Nussbaumer Knaflic's Storytelling with Data is a useful reference textbook. The data journalist Mona Chalabi mixes storytelling and infographics engagingly in the YouTube video Sequence, Sequence… Surprise! Designing Data for Maximum Impact.

The blog post A Brief History of Data Visualization provides a useful historical summary of key milestones in the evolution of data visualisation.

Games to help make it clear that interpreting visual information is easier than tables of numbers could be used, for example, speed games such as 'spot the outlier' or 'spot the maximum'. Is it easier to spot the feature of interest when it's a number in a table or in a visualisation?

When exploring the key elements of a chart, a useful demonstration to highlight the importance of these elements in terms of understanding may be to build up a chart one element at a time. When does it begin to become meaningful? When does it become useful? What were the elements of the chart that made it meaningful?

When exploring graphical conventions, links could be made to conventions in literacy. How easy is it to understand a text when the author doesn't follow spelling or grammatical conventions? Comparisons could be made to 'reading' a chart (data literacy) and reading a text.

Outcome 2

Some examples of misleading charts can be found on Statistics How To, and The Economist. Venngage provides a good summary of the common ways in which charts can be misleading (ironically, as an infographic).

Outcome 3

It would be beneficial if learners peer-evaluated fellow learners' visualisations and provided feedback, to both provide a target audience for the learner creating the visualisation and reinforce the key elements of effective data communication.

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.

Outcome 1 — Interpret a range of data visualisations and Outcome 2 — Explain the features of effective data communication.

A suggestion for gathering the knowledge evidence required for outcome 1 and outcome 2 is a written test consisting of a mix of multiple-choice, restricted response or short answer questions, marked and assessed traditionally, where the questions are based on:

- **At least three** data visualisations which meet the following criteria:
  - one of the visualisations must be a dashboard
  - must include visualisations for both numerical and categorical data
  - may be simple, eg bar chart or scatter plot
  - may be accompanied by an explanation describing the purpose and context in which the data visualisation was produced
  - may be accompanied by a brief, the purpose of which is to set one or more specific goals or define one or more specific questions which the visualisation should be used to answer
  - may be derived from real or fictitious data

- **At least two** data visualisations that are deliberately misleading

Higher National Unit Support Notes (cont)

Unit title: Communicating with Data (SCQF level 7)

When testing is used, the sampling frame must always include the following:

- The purpose of data communication
- Types of data visualisation
- Data quality
- Key elements of a data visualisation
- Extraction of meaning from a data visualisation
- Misleading representations

The assessment must be undertaken in supervised conditions and should be closed-book. Candidates may not bring to the assessment any notes, textbooks, handouts or other material (calculators are not allowed). The questions presented must change on each assessment occasion.

Candidates must answer at least 60% of the questions correctly to pass this assessment. If a centre is presenting this assessment online the following assessment methods, where appropriate, may be selected:

- multiple-choice
- drag-and-drop
- multiple-response
- mix-and-match
- a combination of the above

There is an opportunity for a candidate to be assessed online subject to meeting the prescribed assessment conditions. A candidate should complete this assessment within 1 hour 30 minutes.

Alternatively, for outcome 2, a suggestion for gathering the knowledge evidence would be by use of oral questions based on the use of **at least two** deliberately misleading data visualisations as stimuli. As a form of formative assessment this could be undertaken during a shared discussion on the ethical dimensions of misleading data visualisation and its implications.

A more contemporary approach to assessment would involve the use of a web log (blog) to record learning and researched case study examples throughout the life of the unit. The blog would provide knowledge evidence in the descriptions and explanations. The blog should be assessed using defined criteria to permit a correct judgement about the quality of the evidence. In this scenario, every knowledge and skill must be evidenced; sampling would not be appropriate.

Higher National Unit Support Notes (cont)

Unit title: Communicating with Data (SCQF level 7)

Outcome 3 — Create a range of data visualisations to provide insights.

The assessment of this outcome could be done using a case study. This would provide a realistic context in which the learner has the opportunity to produce data visualisations to solve a problem.

If a case study is used, a clear brief must be provided. This should relate to a specific data communication task faced by a team within a particular organisation, have a specific objective, and be targeted at a particular audience. It should include background information on the organisation, the task, the team and the audience.

A checklist must be developed that defines the standards to be achieved. This checklist should include, **as a minimum**, the following knowledge/skills:

- Selection of an appropriate form of visualisation for the intended purpose and audience, and the data
- Preparing data for visualisation
- Identifying key performance indicators
- Matching visualisation to audience, eg structure, aesthetics and annotations
- Creating visualisations using software
- Creating dashboards and reports

At least three data visualisations must be produced, including visualisations for both numerical and categorical data, and a dashboard. Each visualisation should be accompanied by one or more statements that describe insights that the learner intends the target audience to take away from the visualisation.

Simple tabular datasets should be provided. Whilst these may require some data preparation prior to visualisation, this is not the focus of the assessment, and should be of a limited nature. For example, the data sets should be well-structured and in a 'tidy' format (ie where each column represents a variable and each row represents an observation) with minimal missing data or data requiring cleaning.

Learners may choose the method of communicating the data visualisations they produce. This could be, for example, by embedding them in a written report, presenting them orally, or publishing them as a blog.

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**.

Higher National Unit Support Notes (cont)

Unit title: Communicating with Data (SCQF level 7)

Opportunities for developing Core and other essential skills

This unit will provide opportunities to develop the following Core Skills at SCQF level 6:

- *Numeracy*: Apply a wide range of graphical skills to interpret and present complex information in everyday situations
- *ICT*: Use ICT independently to carry out a range of processing tasks
- *Problem Solving*: Analyse a complex situation or issue; plan, organise, and complete a complex task; review and evaluate a complex problem-solving activity

Depending on the nature of the learning activities adopted, this unit may also help develop the following Core Skills at SCQF level 6:

- *Communication*: Produce and respond to oral communication on a complex topic
- *Working with Others*: In complex interactions, working with others co-operatively on an activity or activities

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 at SCQF level 6 is 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 embedded. Core Skill Information and Communication Technology at SCQF level 6 embedded.	09/12/20

Unit template: June 2017

General information for learners

Unit title: Communicating with Data (SCQF level 7)

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.

Raw data is hard to understand and hard to communicate to others. For it to be of value it needs to be 'packaged' in a visual format, in a way that makes it easy to understand and easy to communicate. When data can be communicated, we can do useful things with it.

This unit is an introduction to the communication of data for non-specialists. No experience of data visualisation or computer programming is required for you to benefit from this unit.

The purpose of this unit is to help you make sense of the range of information that we are all exposed to in a graphical format, such as graphs, infographics, charts and plots (which can all be termed data visualisation), and introduce you to the interpretation of information presented in this way. You may have seen examples of graphs in which the data is presented in a misleading way. This unit will help you identify when creators of such graphs are trying to mislead you and explore the ethics around producing accurate or misleading visualisations. Finally, this unit will help you develop the skills to create your own visualisations to communicate data with others.

You will learn how individuals and organisations use data visualisations to make informed decisions; how to interpret a range of data visualisations including bar charts, histograms, scatter plots and line charts; how to identify misleading information in visualisations; what you need to do to communicate data effectively; and how to create your own data visualisations to provide insights.

The unit covers the following topics, amongst others:

- Purposes of data communication
- Forms of data communication
- Types of data visualisation
- How data visualisation has evolved
- Extracting meaning from a data visualisation
- Key considerations for good data communication
- How good representation and presentation choices facilitate understanding
- Selecting the right type of visualisation to use
- Designing data visualisations
- Preparing data for visualisation
- Creating visualisations using software
- Ways in which data visualisation can mislead
- Ethical considerations

Assessment will likely be through a range of assessment methods, most of which will be highly practical in nature, including assignments and case studies.

After completing the unit, you will be able to communicate the results of data analysis you have undertaken to others and interpret data visualisations produced by others.

You may progress to J4Y6 35 *Working with Data* and J4Y6 35 *Communicating Data* at SCQF level 8.

General information for learners

Unit title: Communicating with Data (SCQF level 7)

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 at level 6 is embedded in this unit. When a learner achieves the unit, their Core Skills profile will also be updated to include this Core Skill.