



National Unit specification

General information

Unit title: Network Literacy (SCQF level 6)

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Superclass: CB

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Unit purpose

This Unit is designed for non-specialists who want to deepen their knowledge and skills in using contemporary networks, such as the internet, and network devices, such as smartphones. It aims to educate citizens in the productive, responsible and critical use of digital technologies. Learners undertaking this Unit will enhance their digital skills and become active participants in the networked society.

Network literacy relates to a range of 'hard' and 'soft' skills, and the underpinning knowledge and understanding. The 'hard' skills relate to technical competencies in using network devices and network systems; the 'soft' skills relate to using software to access and use network resources, including an appreciation of their implications for the individual, groups and the wider society. At this level, learners' knowledge and skills are developed to an advanced standard.

This Unit will develop skills in using a range of network devices. It also covers the underpinning knowledge to facilitate transferable skills so that learners can apply their skills to new technologies, and to support further studies in computer science and information technology. It is suitable for most learners who want to develop their digital skills in preparation for further studies (in any subject area) or employment (in any position).

At the completion of this Unit, learners will possess advanced digital skills in using network systems (such as the Internet) and network devices (such as smartphones), and have an appreciation of their applications and implications for the individual, groups and society.

National Unit specification: General information (cont)

Unit title: Network Literacy (SCQF level 6)

Outcomes

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

- 1 Select network devices.
- 2 Secure a network.
- 3 Collaborate using a network system.

Credit points and level

1 National Unit credit at SCQF level 6: (6 SCQF credit points at SCQF level 6)

Recommended entry to the Unit

Entry is at the discretion of the centre. It is recommended that the learner has achieved *Network Literacy* at SCQF level 5 or equivalent.

Core Skills

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

Complete Core Skill	None
Core Skill component	Accessing Information 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 may be offered stand-alone or as part of the National Progression Award in *Digital Passport* at SCQF level 6. If offered as part of this Group Award, there may be opportunities to combine and integrate teaching and learning across Units. There may also be opportunities to combine Evidence Requirements and integrate assessments.

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.

National Unit specification: Statement of standards

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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

Select network devices.

Performance Criteria

- (a) Explain the function and characteristics of hardware and software devices in a network.
- (b) Explain the hardware and software factors that affect network operation and performance.
- (c) Select network devices for a defined purpose.
- (d) Explanations and descriptions use terminology appropriately, correctly and routinely.

Outcome 2

Secure a network.

Performance Criteria

- (a) Explain the importance of security for individuals, groups, businesses and nations.
- (b) Describe the most common threats to network security and the potential solutions.
- (c) Describe the common security settings in network devices and social networks.
- (d) Secure a network connection using hardware and software to provide safe personal use.
- (e) Secure a social network to provide appropriate personal privacy and security.

Outcome 3

Collaborate using a network system.

Performance Criteria

- (a) Explain the current and future growth of networks, and the implications of this growth.
- (b) Explain the personal and economic value of networks.
- (c) Explain the rights and responsibilities when collaborating online.
- (d) Explain how network systems can be used for collaboration purposes.
- (e) Use a network to collaborate for a defined purpose.
- (f) Use a personal learning network for a defined complex learning task.
- (g) Write appropriately for specific networks and communities, adhering to community behavioural protocols.
- (h) Use networks safely, responsibly and ethically.

National Unit specification: Statement of standards (cont)

Unit title: Network Literacy (SCQF level 6)

Evidence Requirements for this Unit

Assessors should use their professional judgement, subject knowledge and experience, and understanding of their learners to determine the most appropriate ways to generate evidence and the conditions and contexts in which they are used. Bloom's Taxonomy has been used to select the verb in each Performance Criterion, and this taxonomy should be referenced when applying Performance Criteria.

Evidence is required to demonstrate that learners have achieved all Outcomes and Performance Criteria. However, sampling may be used in certain circumstances (see below) where the sample is sufficiently random and robust to clearly infer competence in the full domain.

The evidence for this Unit may be written or oral or a combination of these. 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 and the use of multimedia. It is recommended that evidence is collected for the Unit as a whole and is a naturally occurring by-product of teaching and learning.

Evidence is required for two types of competence: evidence of cognitive competence (knowledge and understanding) and evidence of practical competence (practical abilities). In certain circumstances, the evidence of cognitive competence may be sampled; the sample must be sufficiently random and robust to clearly infer competence in the entire knowledge domain. For example, if a traditional test is used to assess a candidate's knowledge and understanding, this test may sample across the knowledge domain; however, if a portfolio approach is taken then it would not be appropriate to sample, and evidence of **every** cognitive competence would be required. Evidence of practical competence cannot be sampled; however the amount of evidence is left to the professional judgement of the assessor and should be the minimum compatible with the requirements of this Unit. For Outcome 3, Performance Criterion (h) competence may be evidenced by exception. In this circumstance, there is no requirement to provide evidence of competence; evidence is only required to demonstrate the absence of competence (unsafe, irresponsible or unethical use of networks).

Evidence must be produced under controlled conditions. However, the amount of control will vary from context to context. For example, evidence of cognitive competence could take the form of a class test, which would permit highly controlled conditions (which would include closed-book assessment). Alternatively, evidence could be generated through the use of web log, written over an extended period of time at varying locations, which would not permit such close control. In every case, assessment must be controlled to some extent. Where the amount of control is low, the amount of authentication should rise. It is not acceptable to produce evidence in lightly controlled conditions with little authentication.

Authentication may take various forms including, but not limited to, oral questioning and plagiarism checks. Some forms of evidence generation (such as video recordings) have intrinsic authentication and would require no further means of verification. Where evidence is not generated under closely controlled conditions (for example, out of class) then a statement of authenticity should be provided by the candidate to verify the work as their own, and also state any necessary sources and permissions. The *Guide to Assessment* provides further advice on methods of authentication.

National Unit specification: Statement of standards (cont)

Unit title: Network Literacy (SCQF level 6)

Evidence of practical competence may be produced over an extended period of time, notwithstanding any Performance Criteria relating to duration or time. Consideration should be given to the use of e-portfolios.

The gathered evidence must span a range of device types and types of information. The precise number of types is left to the discretion of the assessor but it would not be acceptable to generate evidence of competence (cognitive and practical) on one network device (such as a smartphone) using one type of information (for example, textual information). Competence should be demonstrated using a number of network devices (such as a smartphone, tablet and desktop PC) and information types (such as text, audio and video).

It is preferred that the evidence is generated naturally, as a by-product of teaching and learning, and integrated into as few assessment tasks as possible. The *Guidelines on Approaches to Assessment* (see the Support Notes section of this specification) provide specific examples of instruments of assessment that seek to do this.



National Unit Support Notes

Unit title: Network Literacy (SCQF level 6)

Unit Support Notes are offered as guidance and are not mandatory.

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

Guidance on the content and context for this Unit

The general context for this Unit is the 'network society', which we are presently experiencing. Young learners (Prensky's 'digital natives') may not have experience of the pre-network age; more mature learners (Prensky's 'digital immigrants') may not appreciate the scale of networking that is presently taking place; neither demographic may appreciate the effects of these changes at an individual, group and societal level. Using historical context for each Outcome may reinforce the scale of change currently taking place.

The purpose of this Unit is to deliver advanced knowledge and skills in the use of network systems and network devices. This Unit is intended for non-specialists and should be delivered in that context, but on completion of the Unit learners should possess highly developed digital skills. However, this is not a Unit in Computer Science and the teaching and assessment should reflect that.

Throughout the Unit, terminology such as 'network system' is used to stand for common communication systems such as the internet or the telephone network, and 'network device' is used to stand for common communication devices such as smartphones, laptops or wearable technology. 'Select network devices' (Outcome 1) can be as simple as choosing a specific smartphone, with 4G and internet connectivity, and an appropriate data plan, if the 'defined purpose' (Performance Criterion (c)) was 'general mobile communication'. Of course, even a simple choice like this is underpinned with significant knowledge and understanding.

At this level (SCQF level 6) learners can be presumed to possess significant knowledge and skills on entry, and the level of treatment of each topic should build on this knowledge- and skills-base. The Unit has significant technical, social and societal contents and the level of treatment should reflect the level of this Unit; for example, a detailed and mature treatment of security issues should be expected.

It is important that the more subjective topics (such as the social implications of networking) are presented in a balanced and objective manner, neither over-emphasising the advantages nor disadvantages. It should be left to the learner to decide if the benefits outweigh the actual (or potential) drawbacks.

National Unit Support Notes (cont)

Unit title: Network Literacy (SCQF level 6)

Outcome 1: This Outcome relates to the selection of network devices. The network components to be considered are not meant to be highly technical, although terms such as 'network interface' (as in 'network interface card'), 'router' and 'server' are expected to be introduced. The focus of this Outcome should be common network components such as wi-fi components, telephony (3G and 4G) components, and network operating systems (such as *Android™*).

Learners should be familiar with the names and functions and characteristics of each component (Performance Criterion (a)). For example, they should appreciate the need for wi-fi interface, what it does, and its characteristics (such as its speed). This Performance Criterion is linked to the next (Performance Criterion (b)), which relates to the factors that affect network performance. A deep knowledge of these factors is not required. However, learners are expected to know the main factors that affect network performance such as bandwidth, server capacity, client speed and communication medium.

The selection of network devices (Performance Criterion (c)) should involve the learner being able to recommend network hardware and software for a specific purpose. For example, if the defined purpose is 'fast mobile access for information look-up and simple communications' then the recommended network components might be a smartphone on a 4G network. At this level, it is expected that learners develop a fairly detailed technical vocabulary (Performance Criterion (d)). It is important that learners use the correct technical terms throughout this Unit.

Outcome 2: This Outcome relates to network ('cyber') security. The approach should be non-technical, when possible, but with sufficient detail to achieve the Performance Criteria.

The key Outcome is that learners are aware of the importance of security for individuals, groups, businesses and nations. At the time of writing, research has shown that young people have low regard for personal privacy and security, so this demographic may require particular attention. Learners may also not appreciate the value of data. The emergence of big data applications will increase the value of data, making it more prone to attack. At this level, learners should also be aware of the threats posed to businesses by industrial espionage and the threats posed to nations by cyber warfare.

Performance Criteria (d) and (e) provide an opportunity to apply their knowledge of security. For example, learners could secure their smartphones from a variety of threats, ranging from friends seeking to access their phone to theft of the device. Social networks typically have a wide range of settings to fine-tune privacy and security, some of which can be confusing for learners. At this level, it is expected that learners would understand and use these settings to customise security and privacy to their specific requirements. There is scope here to discuss social network analysis (the relationships that exist within social networks) and how this affects the sharing of information.

Outcome 3: This Outcome relates to collaboration over a network. Learners are required to know (Performance Criteria (a)–(d)) and use (Performance Criteria (e)–(h)) network systems for collaborative purposes.

National Unit Support Notes (cont)

Unit title: Network Literacy (SCQF level 6)

Performance Criteria (a) and (b) are effectively the pros and cons of modern network systems. Young learners, in particular, may be unaware of both, particularly the latter (their implications). All learners may require significant explanation of the personal, community, societal and global implications of contemporary network systems. For example, their potential for alienation and isolation is counter-intuitive given that they are communication systems. There is scope here for group discussions and case studies to highlight some of the issues.

Performance Criterion (a) relates to the rapid growth of computer networks (and network devices such as smartphones) and the associated exponential growth in information that this has facilitated. At this level, learners are expected to know not only the scale of this growth but also the technological, economic and societal reasons for it, and the personal, economic and political implications of this. The future growth of networks will likely be fuelled by the Internet of Things (IoT) — and this will present society with further challenges. At the time of writing, there has been significant public debate about the ‘surveillance society’ and the threat posed to civil liberties by the growth of network systems, which provide unprecedented opportunities for states to monitor the communications, behaviours and beliefs of citizens.

This Performance Criterion is linked to the next one (Performance Criterion (b)), which relates to the value of networks. Many learners will be unaware of the value of networks, in particular the ‘network effects’ that are realised once a network gets to a certain size and how this can be leveraged for social or business intelligence (such as crowd sourcing). An appreciation of Metcalf’s Law is appropriate at this level. At SCQF level 6, learners are expected to hold considered views on these issues and appreciate their historical context (their relatively recent origin and their exponential growth). An example of the societal implications of the growth of networks is the recent (at the time of writing) science of ‘big data’, which has potentially important implications for individuals and societies. This new science is enabled by the (often) real time harvesting of huge quantities of data, which is made possible by the huge increase in network systems and network devices (and sophisticated network (database) software). The business models of social media enterprises (such as Facebook™) may not be readily understood by many learners who may not appreciate how a ‘free’ service can have such a high commercial value (in terms of market capitalisation). There is scope in this Outcome to discuss the economic value of information: it has been suggested that social media enterprises should pay users for their data (essentially profit sharing) and this business model could be used to illustrate the value of information.

With respect to learner collaborations (Performance Criterion (e)), the **engagement pyramid** provides a useful reference framework for explaining the sorts of contributions that can be made (ranging from ‘Watching’ to ‘Curating’). At this level, learners would be expected to contribute up to, and including, the ‘Curate’ level in this framework.

Learners are required to use their personal learning network (PLN) for a complex learning activity (Performance Criterion (f)). It is recommended that this is an actual (rather than contrived) learning activity. For example, school or college learners could use their PLN for learning linked to another subject that they are studying; people in employment could use their PLN for research linked to their job role.

National Unit Support Notes (cont)

Unit title: Network Literacy (SCQF level 6)

Writing for a specific network (Performance Criterion (g)) is simply about writing appropriately for the medium. For example, 'text speak' is acceptable in a text message over a 3G network but would not be appropriate in an online forum discussing an academic topic. This Performance Criteria relates to more than style of writing: online writing provides new affordances (such as hyperlinking to sources) and this should be explored and explained to learners. Learners are expected to know and adhere to the behavioural standards expected (implicitly or explicitly) on each type of network (ranging from simple message networks to formal discussion forums). There is an opportunity to develop, in consultation with learners, an agreed set of 'network standards' [of behaviour] that the class group is expected to adhere to.

This Outcome encompasses online safety, online responsibility and ethics (Performance Criterion (g)). It is anticipated that this will constitute a significant part of this Outcome. It is important to discuss this topic in a balanced and objective manner, neither over-emphasising threats nor opportunities. Their responsibilities encompass the legal constraints on their use of computer networks, which, at the time of writing, include data protection, intellectual property and privacy. At this level, it is expected that learners acquire a fairly sophisticated understanding of these issues. Ethical considerations are new at this level. It is expected that learners will be mature enough to enter into detailed discussions on the ethical considerations surrounding the use of network systems, and apply this understanding to their use.

Guidance on approaches to delivery of this Unit

A practical, hands-on approach to learning should be adopted in order to engage learners and exemplify key concepts. However, all practical activities should be underpinned with appropriate knowledge before learners commence these activities. Learners should acquire transferable skills so all teaching should be delivered with this in mind and not made too specific to a single network device or network system.

At this level, it is expected that learning will be a mix of tutor-led and self- or peer-learning. New concepts will need to be introduced by the tutor but learners can be expected to research topics and be self-motivated. Self- or peer-learning should be carefully devised and monitored. Opportunities should be taken to motivate learners through the use of engaging technology such as multimedia (eg music and video), social media (social networks and blogs) and computer games. For many young people, music can be a great motivator and many of the competencies in this Unit can be delivered in that context (for example, through online music services, such as Spotify™, that permit network sharing and collaboration). For more mature learners, motivational activities include music, movies and special interest online groups.

The distribution of time over the three Ois at the discretion of the centre and thus will be influenced by a number of factors such as the actual technologies utilised. However a possible distribution is as follows:

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

National Unit Support Notes (cont)

Unit title: Network Literacy (SCQF level 6)

Throughout this Unit learner activities should relate to their personal or vocational interests. Learners should be encouraged to become confident with as wide a range of digital technologies as possible. It may be appropriate that learners' activities relate to their personal interests, and the use of case studies is recommended.

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.

The Outcomes can be assessed in a variety of ways. A traditional approach would involve the testing of knowledge through a selected response test. It is recommended that if this approach is adopted then all of the knowledge and understanding in this Unit is combined into a single test that samples from the knowledge domain, with an appropriate pass mark. The remaining practical competencies could be assessed through observation of candidate activity throughout the duration of the Unit (and recorded on an observation checklist).

Another approach to assessment would be the creation and maintenance of a web log, which would record candidate activity throughout the Unit. This would log, on a daily or weekly basis, what candidates learn and what they do. However, their posts would have to satisfy the relevant Performance Criteria. So, for example, the post that relates to Outcome 1, Performance Criterion (c), would have to provide adequate details about the selections made and the reasons for these selections (perhaps with photographic evidence to support the narrative). Practical activities could also be recorded *via* the blog. For example, the post relating to Outcome 2, Performance Criterion (e), would describe how the candidate set up their Facebook™ profile, accompanied by relevant screenshots.

When practical activity is recorded on a blog, authentication could involve a photograph or video of candidate activity or a screenshot illustrating the criterion (such as a screen shot of a smartphone's security settings). Not every practical task would require authentication; at this level it is acceptable for some posts to be a simple description of appropriate practical activities. When necessary, separate authentication (such as oral questioning) could be used for verification purposes. The critical aspect is that the blog is an **overall** accurate reflection of the practical activities (and, therefore, the associated skills) carried out by the learner during the life of the Unit.

Another approach would involve the creation and maintenance of an e-portfolio. The e-portfolio would include all of the descriptions and explanations necessary to satisfy the criteria relating to cognitive competencies (in this case, there is no justification for sampling), together with digital artefacts that provide evidence of their practical abilities. The latter [digital artefacts] would include screenshots, lists, clipped information, digital checklists, digital glossaries, etc. that collectively evidence candidates' practical competencies. Some form of authentication would be required for a significant proportion of the gathered items. But this could be as simple as a statement of originality, signed by the candidate, and counter-signed by the assessor, or a digital audio recording of a brief question-and-answer session between the candidate and the assessor.

National Unit Support Notes (cont)

Unit title: Network Literacy (SCQF level 6)

Opportunities for e-assessment

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

National Unit Support Notes (cont)

Unit title: Network Literacy (SCQF level 6)

Opportunities for developing Core and other essential skills

This Unit provides opportunities to deliver some of the following Core Skills:

- ◆ *Information and Communication Technology (ICT)* (SCQF level 6).

There is limited coverage of this Core Skill. The security of data is covered in Outcome 2 and Outcome 3.

Some other ICT Core Skills may be covered, depending on delivery. There are opportunities in this Unit to cover the selection and start-up of software (when using networks), and entering and editing data (when using networks for social or learning purposes). It is likely that some searching will be conducted (across networks) when using networks for collaboration or learning purposes (Outcome 3). These activities may cover the search-related skills defined as part of this Core Skill.

In addition to Core Skills, this Unit provides opportunities to develop citizenship skills.

This Unit has the Accessing Information component of Information and Communication Technology embedded in it. This means that when candidates achieve the Unit, their Core Skills profile will also be updated to show they have achieved Accessing Information at SCQF level 6.

History of changes to Unit

Version	Description of change	Date

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General information for learners

Unit title: Network Literacy (SCQF level 6)

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

This Unit aims to educate you in the productive, responsible and critical use of digital technologies.

You are expected to have previous experience of computers and networks before undertaking this Unit. The Unit seeks to develop these skills to an advanced level. It covers important knowledge and skills about network devices, such as smartphones and PCs, and network systems, such as the telephone network and the internet, so that you are able to confidently use these devices on a daily basis for personal, social or community purposes.

The Unit will deepen your knowledge of network devices (such as smartphones, tablets and PCs) and network systems (such as your home network and the internet). It covers a wide range of knowledge and skills including:

- ◆ the importance of networks and their rapid growth
- ◆ the value of data including 'big data'
- ◆ how network devices and network systems work
- ◆ the implications of networks for you, the country and the world
- ◆ the need for cyber security by individuals, businesses and nations
- ◆ how to use networks to collaborate with friends and colleagues
- ◆ how to customise social networks, such as Facebook™, to protect yourself
- ◆ how to create your own personal learning network
- ◆ how to customise your smartphone, tablet or PC
- ◆ how to communicate appropriately online
- ◆ your rights and responsibilities
- ◆ ethical considerations
- ◆ the implications for citizens posed by the networked society

This Unit is designed for learners with previous experience of computers and networks who want to deepen their existing knowledge and skills to make them more effective and active users of network systems. It is particularly suitable for the 'digital citizen' — the person who needs to learn about computers to participate in modern society.

The assessment may take different forms. It will be straight-forward and not take a great deal of time. It may involve a short test of your knowledge and some practical tasks, or it may simply be a record of your activities during the Unit. But the focus of the Unit is on learning — not assessing.

The key goal of this Unit is to develop your digital skills to an advanced level so that you can fully participate in a networked society. **On completion of this Unit you will be able to use smartphones, tablets, PCs and other digital devices for a wide range of personal and social purposes, including accessing and using a variety of internet services.**

On completion of this Unit you could progress to Higher National Units in the fields of networking or computer science.