Core Skills Framework: an introduction

Numeracy

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Introduction

Core Skills enable people to put their knowledge, skills and understanding into action flexibly, adapting them to new situations. Core Skills apply to a wide range of contexts in education and training, in life, and in work. They underpin and promote the development of learning and study skills, and provide a foundation for lifelong learning and personal development.

The importance of Core Skills is widely recognised in employment and education. Lifelong learning that builds on people's Core Skills is essential if individuals are to fulfil their personal needs and meet the needs of society. In the workplace, employees at every level are increasingly expected to take responsibility for the quality of the products and services they produce or provide. Individuals who can analyse and solve problems, communicate well, use information technology, and work with others effectively, are well-equipped to assume the active, flexible and responsible roles that modern workplaces need.

A wide variety of skills and qualities are developed and used in education and training, in work and in life. Some of these are 'core' to personal development and performance.

First, there are skills for **tackling issues and problems**. These skills include being able to:

- think critically and creatively
- analyse situations and suggest courses of action
- plan and organise what is involved and carry it through to completion
- reflect on what has been done and draw conclusions for the future

Second, there are skills that are vital in enabling individuals to function effectively. **Communication**, both orally and in writing, is essential for clarifying your own thoughts, for relating to others, and for learning and working. The **numerical skills** involved in processing, interpreting, and communicating information can help you to understand, predict, and solve many types of problem. Skills in **using information and communication technology** are increasingly essential for obtaining and analysing information, for organising your ideas, and for communicating and working with others. And being able to **work with others** means having interpersonal skills that help you to co-operate with others in personal, learning and working situations to identify and achieve your shared goals.

The Core Skills

Each Core Skill, and its components, can be assessed at SCQF levels 2–6. This section gives you a brief description of each component, and describes the range of activities that its assessment will involve at the different levels.

Core Skill: Problem Solving

The three components of this skill are the stages involved in tackling issues and problems in personal, social, and work contexts. They are often used in sequence, and repeatedly. Each component can also be a focus of activity in its own right.

Component: Critical Thinking

Critical Thinking is about using analysis and reasoning to make decisions and to create or suggest ideas, courses of action, and strategies. Attainment levels range from:

- working in situations that involve a few, easily-identified factors set in familiar contexts

to:

- working in more complex situations that require a greater degree of analysis before approaches can be devised

Component: Planning and Organising

Planning and Organising is the ability to plan a task, taking account of available resources, and to manage the task to completion. Attainment levels range from:

- creating plans involving a small number of steps and using familiar resources

to:

- efficient management of a more complex plan, which may include a review of strategy and a degree of research in identifying the resources to be used to deal with difficulties

Component: Reviewing and Evaluating

Reviewing and Evaluating is the ability to reflect on and review the process of tackling issues and problems, to evaluate the outcomes, and to identify where alternative strategies might have been used. Attainment levels range from:

- identifying a strength and weakness in a strategy

to:

- identifying and gathering evaluation evidence, evaluating strategies, and making appropriate recommendations

Core Skill: Communication

Communication skills underpin almost all personal, social, learning, and working activity. They are essential in clarifying your thoughts, in interacting and conversing effectively with others, and in conveying information, feelings, and opinions.

Component: Oral Communication

Oral Communication means being able to take part in discussions and make presentations, interacting with your audience as appropriate. Attainment levels range from:

- conveying basic information and opinions through short, informal communications on familiar topics

to:

- presenting and analysing complex information and issues through more sustained discussions or presentations on complex topics, as well as listening and responding to what others say

Component: Written Communication

Written Communication is the ability to write and respond to writing (reading). Attainment levels range from:

- dealing with brief communications expressing a few basic ideas or pieces of information about familiar topics

to:

- dealing with communications which analyse and explore complex information and issues

Core Skill: Numeracy

To cope with the demands of everyday life, including work and study, people need to be comfortable with numbers and with graphs, symbols, diagrams, and calculators. The skills needed for this involved interpreting, processing, and communicating, quantifiable and spatial information.

Component: Using Graphical Information

This is the ability to interpret and communicate quantifiable information that is given in writing, diagrams, or pictures. Attainment levels range from:

- working in familiar contexts with simple, specified tables, graphs and shapes

to:

- working in more abstract contexts and with more complex graphical information which may require some analysis, and where decisions have to be made on effective ways to communicate the information

Component: Using Number

This is the ability to apply numerical and other relevant mathematical and statistical skills. Attainment levels range from:

- working confidently with basic numbers in everyday contexts

to:

- working confidently with more complex numerical concepts and techniques in more abstract contexts

Core Skill: Information and Communication Technology

Information and Communication Technology is concerned with the electronic collection, organisation, analysis, presentation, and communication of information. It encompasses all media types and formats as well as all relevant tools.

The Core Skill focuses on the ability to use information and communication technology to process information in a variety of ways which will be necessary for further learning in work and in the home. It is not about developing IT specialists who will act as first-line support for others or install specialist systems.

This is a rapidly progressing area. While the standards and examples given provide a snapshot for 2013, the framework has been designed to be flexible enough to accommodate any further digital skills deemed essential for everyday use.

Component: Accessing Information

This is the ability to use information and communication technology to support a range of information-accessing activities. Attainment levels range from:

- accessing basic information and communication technology to perform simple processing of familiar data and to select information from a local database or a simple internet search

to:

- making effective, responsible, and secure use of information and communication technology, using application software in a context requiring some analysis and evaluation, and retrieving information from a range of sources

Component: Providing/Creating Information

This is the ability to use information and communication technology to provide, create, and process information. Attainment levels range from:

- using familiar application software to carry out very simple processing tasks and providing/creating very simple information technology

to:

- using a range of information and communication technology in unfamiliar contexts, observing security procedures and the needs of other users. Evaluating and sharing information

Core Skill: Working with Others

The fact that Working with Others is a Core Skill emphasises the importance of co-operation and teamwork in social, learning, and working situations. Working with Others has two components: Working Co-operatively with Others, and Reviewing Co-operative Contribution.

While achieving a shared goal is the main focus, co-operation with others should be developed through all stages of any collaboration.

Reviewing your own contribution and learning through reflection also has a wider application to personal development.

Component: Working Co-operatively with Others

This is about using interpersonal skills appropriately, to recognise and value the roles of other people, taking responsibility for your own contribution, and supporting co-operative working in appropriate ways. Attainment levels range from:

- identifying, with support, your own role and the roles of other people, and helping to achieve a shared goal

to:

- analysing the roles and behaviour of others and adapting your own behaviour to deal with the complexity of changing and challenging dynamics

Component: Reviewing Co-operative Contribution

This is the ability to discuss the process of working co-operatively with other people, reflecting on and reviewing the collaboration. This might include commenting or resolving issues and handling other people's behaviour.

Learners should evaluate the outcomes, identify the value of their own contribution, and reflect on any personal learning and development that may be needed to enhance their contribution to future collaborative work.

Attainment levels range from:

- identifying a strength and weakness in the way you helped achieve things together, suggesting how your own contribution could be strengthened in the future

to:

- identifying and gathering evidence, critically evaluating your own contribution, and making appropriate recommendations about future learning and contributions

Core Skills certification

Since 1999, candidates for SQA qualifications have been able to show what they have achieved in Core Skills.

Candidates with Standard Grades will already have a Core Skills profile. Also, many candidates undertaking key National Courses, supporting Curriculum for Excellence, should get a Core Skills profile.The Core Skills Profile is reviewed each time they achieve a new SQA qualification. There is no need for candidates to achieve all Core Skills, or to complete a Group Award. Their profile will report their Core Skills achievements by component — so Core Skills certification is available to those who do not complete a whole Core Skill.

With increasing emphasis being placed on Core Skills in education (including higher education), training, and employment, it is important that candidates are given the opportunity to be credited for what they can do.

Candidates can achieve Core Skills through:

- any Unit, Course or Award which has been audited against the Core Skills framework and validated as fully covering one or more Core Skills component
- named Core Skills Units

In the former case, certification will be automatic. Candidates will not need to enter for the Core Skills component — the entry on the Core Skills profile will be generated automatically by SQA when they achieve the relevant Unit, Course or Award.

Named Core Skills Units are available for use by schools, colleges, higher education institutions, and training providers, and in the workplace.

The purpose of this document

The remainder of this document provides detailed technical specifications for each Core Skill for use by those designing programmes of learning and teaching in Scotland. This document should support practitioners in the teaching and learning of Core Skills, this does not always have to be tied to certification. It can also be used for auditing Units, Courses, Awards, assessment programmes, and Group Awards, and by SQA staff.

The document gives definitions of the Core Skills at each level and the specific skills in each. It also gives details of how the skills could be applied by the candidate. The further information section should be interpreted in the context of the Unit/Course. The section is not a list of mandatory requirements. It gives examples of how a candidate can show the development of the specific skills.

Using Graphical Information SCQF 2

General skill

Read and use very simple graphical information in familiar everyday situations.

Specific skills

The candidate must:

- extract information from a very simple table or diagram
- communicate information in a very simple table or diagram

Further information

Familiar everyday situations might involve calendars, work timetables or schedules, or transport timetables — the candidate should be able to extract required information from these sources with prompting/support.

Tables and diagrams should be designed for the candidate to complete with prompting/ support.

The candidate can show this through:

- extracting information from a very simple table containing one category of information

or

- extracting information from a very simple diagram
- communicating by adding information to a partially completed table and diagram

Examples of tasks might include:

- finding bus departure times from a table showing one destination
- finding a school on a very simple street plan of the local area
- finding the time of a programme from a very limited broadcasting schedule
- producing a simple room plan using shapes provided

Using Graphical Information SCQF 3

General skill

Read and use simple graphical information in everyday situations.

Specific skills

The candidate must:

- extract information from: simple tables, graphs, charts, or diagrams
- communicate information appropriately through: simple tables, graphs, charts, or diagrams as appropriate

Further information

Suitable tasks would be provided by timetables or schedules; catalogue or brochure tables; or distance/time graphs.

Tables, graphs, charts, or diagrams should be selected and designed for the candidate to complete. In the case of a graph involving a scale, the scale should be given. Communication in simple diagrams should only involve two-dimensional shapes. The graphical form used to communicate information should be specified for the candidate.

The candidate can show this through:

- extracting information from at least one of the following:
  - a simple table containing two categories of information
  - a simple chart — eg bar or pie chart
  - a simple graph — eg a line graph with a simple scale
  - a simple diagram — eg a diagram of a 2D shape, a 2D representation of a familiar 3D shape, a simple map
- communicating information in at least one of the following: simple tables, graphs, charts, or diagrams

Examples of tasks might include:

- comparing the cost of 1st and 2nd Class postage for a given package
- using a street map to find your nearest swimming pool
- drawing a simple map
- completing a fuel consumption chart for a car
- producing a simple chart showing male and female preferences for jeans
- working out best value from a simple mobile phone tariff table

Using Graphical Information SCQF 4

General skill

Interpret and communicate straightforward graphical information in everyday situations.

Specific skills

The candidate must:

- extract information from a straightforward table, graph, chart, or diagram
- use appropriate graphical forms to convey particular types of information
- communicate information in straightforward tables, graphs, charts, or diagrams

Further information

Work timetables or schedules, transport timetables, or distance/time graphs would provide suitable tasks. It is assumed that the candidate will be familiar with common types of tables, graphs, charts, or diagrams in everyday use, but evidence of each of these is not required.

The form in which the candidate will communicate information should be familiar.

The candidate can show this through:

- interpreting information from at least one of the following:
  - a table containing three or four categories of information
  - a chart — eg a bar or pie chart
  - a graph with a straightforward scale —eg a line graph
  - a straightforward diagram — eg a circuit diagram, a 2D representation of a 3D shape, a map)
- communicating information appropriately in at least one of the following: straightforward tables, graphs, charts, or diagrams

Examples of tasks might include:

- costing a holiday using tables from a brochure showing prices according to date of departure, hotel chosen, length of stay
- producing a straightforward circuit diagram or map
- showing results of a survey in an appropriate format for others to read and make comparisons

Using Graphical Information SCQF 5

General skill

Interpret and communicate graphical information in everyday situations.

Specific skills

The candidate must:

- interpret information from a table, graph, chart, or diagram
- use an appropriate form of table, graph, chart, or diagram, to communicate information

Further information

The candidate should interpret information which has either been presented as a number of related, straightforward forms; or in one complex form. Interpreting information must go beyond simply extracting information and include, where appropriate, interpolation and extrapolation.

The candidate will be familiar with a range of common graphical forms, and will use an appropriate form in which to convey particular information.

The candidate can show this through:

- communicating information in an appropriate form using tables, graphs, charts, or diagrams
- interpreting information presented in a complex graphical form — eg qualitative graphs; graphs where part of the axis has been omitted; histograms; graphs showing concepts/relationships such as cumulative frequency or complex variables

or

- interpreting information from a series of straightforward, interconnected tables, graphs, charts, or diagrams

Examples of tasks might include:

- forecasting fuel costs for an organisation from past fuel consumption and cost data
- calculating acceleration from a velocity/time graph
- calculating a number in a specific age group from a population pyramid
- producing a histogram showing customer breakdown by age, gender, and income
- using national household survey tables, determine to what extent gender has an effect on income

Using Graphical Information SCQF 6

General skill

Apply a wide range of graphical skills to interpret and present complex information in everyday situations.

Specific skills

The candidate must:

- extract, analyse, and interpret graphical information
- use an appropriate form of complex table, chart, diagram, or qualitative form, and communicate complex information in that form

Further information

The candidate should extract, analyse, and interpret information which has been presented in complex graphical forms — eg statistical data in graphical format.
The candidate will be familiar with a range of common graphical forms and will use an appropriate type in which to convey particular information. The type used may be qualitative — eg a graph with no scales on the axes showing a relationship or trend.

The candidate can show this through:

- identifying significant features in complex graphical information — eg patterns, scatter, discontinuities, rates of change — and interpret these in relation to the underlying variables
- communicating information in an appropriate form — eg table, line graph, bar chart, pie chart, histogram, diagram, or qualitative form such as a graph with no scale on the axes

Examples of tasks might include:

- using a population growth graph to forecast need for secondary school places
- drawing a diagram of a room layout to scale
- reading weather maps to postpone/advance sailing outings
- producing a series of charts to demonstrate staff turnover rates for different grades of staff

Using Number SCQF 2

General skill

Apply very simple numerical skills in familiar everyday situations using time, money, and measurement.

Specific skills

The candidate must:

- recognise and use some basic numerical notation
- choose one numerical operation to be carried out
- carry out very simple numerical calculations
- make very simple comparisons
- read and use a very simple scale which is numbered

Further information

The candidate will be able to carry out very simple calculations which are relevant to familiar everyday situations.

Calculations may be carried out mentally, in writing, or using a calculator or other electronic device — eg a computer. Candidates may give exact or approximate answers as appropriate. Candidates should check their answers, but evidence of checking is not required.

The candidate can show this through:

- recognising and using two of the following: whole numbers, very simple decimals, very simple fractions
- carrying out all of the following: addition, subtraction, very simple multiplication, and very simple division of whole numbers
- making a very simple numerical comparison between items
- reading and use a very simple scale, on which every division is numbered
- using a familiar measuring instrument to measure to the nearest marked number

Examples of tasks might include:

- working out very simple financial transactions — eg recognising when change is due
- adding numbers in a group
- dividing portions of food — eg sharing a pizza equally between four people
- recognising different times for familiar activities
- recognising half-price in a sale is the same as 50% off
- recognising that a tin of beans at 47p is much more expensive than a similar tin on offer at 32p
- measuring with a ruler, metre stick, or tape measure
- weighing ingredients with household scales
- taking the temperature of a room with a thermometer

Using Number SCQF 3

General skill

Apply simple numerical skills in everyday situations.

Specific skills

The candidate must:

- work with basic numerical notation
- select appropriate methods to be applied to particular tasks
- carry out simple numerical calculations (addition, subtraction, multiplication and division)
- draw simple conclusions from results produced
- read and use a simple, numbered scale

Further information

Everyday situations might involve money, time, length, weight, area, volume, temperature. Tasks will be familiar and will involve only a small number of obvious steps.

Calculations may be carried out mentally, in writing, or using a calculator or other electronic device — eg a computer. Candidates may give exact or approximate answers as appropriate. Candidates should check their answers, although evidence of checking is not required.

The candidate can show this through:

- using notation for each of the following: whole numbers, simple decimals, simple percentages, simple fractions, simple ratios — eg 1:3, 5:1
- deciding what calculations need to be carried out and in what order — eg add then multiply
- carrying out all of the following: addition, subtraction, multiplication, division
- carrying out simple calculations involving one of the following: whole number percentages, simple fractions — eg ¾
- reading and using a scale which has only the main divisions numbered
- using a measuring instrument to measure to the nearest numbered division, or use the scale on a graph to determine quantities to the nearest numbered division

Examples of tasks might include:

- calculating a floor area
- calculating the effect of a 10% price rise
- calculating the score after three darts in a game of 301
- calculating double quantities for a recipe and using scales to weigh accurately
- deciding on the appropriate time to leave the house to arrive in time for work, based on the given departure and arrival time taken for a short journey
- decide on how many adults are needed to accompany children on an outing to comply with current legislation
- measuring with a ruler, metre stick, or tape measure where the scale has 0 and 10 labelled, and five subdivisions

Using Number SCQF 4

General skill

Apply a range of straightforward numerical skills in everyday situations.

Specific skills

The candidate must:

- work confidently with basic numerical notation
- select appropriate numerical methods to be carried out
- carry out a range of straightforward numerical calculations
- draw straightforward conclusions from results
- read and use a straightforward scale

Further information

Everyday situations might involve money, time (including the 24-hour clock), length, weight, area, volume, and temperature. While there may be a number of steps involved in the process, they will not always be obvious and may need to be clarified before any calculation takes place.

Calculations may be carried out mentally, in writing, or using a calculator or other electronic device — eg a computer. It is assumed that candidates will be able to add, subtract, multiply and divide, but evidence of all the basic operations is not required. Candidates will round answers to a given degree of accuracy — eg to two decimal places. Candidates should check answers, although evidence of checking is not required.

The candidate can show this through:

- reading and using a straightforward scale which has all the main divisions numbered and sub-divisions marked
- using notation for all of the following: whole numbers, decimals, percentages, fractions, ratios
- deciding which calculations are to be carried out, and the order in which to carry them out — eg add then multiply. At this level, candidates must show that they can carry out calculations to solve straightforward problems requiring at least two stages to arrive at an answer
- carrying out calculations with whole numbers and decimals — eg adding money
- carrying out calculations involving the following: percentages, fractions, ratios
- using a measuring instrument to measure to the nearest marked unnumbered division, or use the scale on a graph to determine quantities to the nearest marked unnumbered division

Using Number **SCQF 4 (continued)**

Examples of tasks might include:

- calculating the space required to store a defined number of standard-sized boxes
- calculating the ratio of males to females, within a particular income bracket, in a local survey
- carrying out a mileage, subsistence, and tax calculations for an expenses claim
- calculating possible winnings from a bet on a horse at particular odds
- measuring ingredients by volume where scale numbering requires specific interpretation
- forecasting the cost of electricity for the coming year based on bills for the previous year, and planning monthly amounts to cover this including adjustment for seasonal variations/price increases

Using Number SCQF 5

General skill

Apply a range of numerical skills in various everyday situations.

Specific skills

The candidate must:

- work confidently to solve a numerical problem
- decide on the types of numerical calculations to be carried out
- decide on steps to be carried out and in what order to solve problems or situations, where the required processes are not obvious

Further information

Tasks may be set in unfamiliar situations where the relevant facts and their importance need to be clarified; or in more familiar situations where an analytical approach is needed.

Calculations may be carried out mentally, in writing, or using a calculator or other electronic device — eg a computer. It is assumed that the candidate will be able to add, subtract, multiply, and divide whole numbers and decimals, and to work with fractions, percentages, and ratios as appropriate, but evidence of all of these is not required. Candidates will round answers to an appropriate degree of accuracy — eg to two decimal places. Candidates should check answers, although evidence of checking is not required.

The candidate can show this through:

- solving problems involving one numerical or statistical concept — eg quantitative and qualitative data, discrete and continuous data, numbers represented by symbols, or a statistical concept such as range
- deciding which operations are to be carried out to solve a problem, and the order in which to carry them out
- carrying out a number of sustained calculations, or at least one specialised calculation
  — eg a calculation involving a scientific formula to determine an outcome

Examples of tasks might include:

- calculating annual profit and loss from monthly returns
- solving an engineering calculation using a formula expressing the relationship between work done, force and distance
- determining disposable income for a household from monthly accounts
- costing materials required to decorate a room

Using Number SCQF 6

General skill

Apply, in combination, a wide range of numerical methods to solve complex problems in everyday and specialised situations.

Specific skills

The candidate must:

- work confidently with numerical or statistical methods
- decide on the steps and operations to be carried out to solve a complex problem
- carry out a number of sustained, complex calculations

Further information

Tasks may involve unfamiliar contexts where the relevant facts and their importance need to be clarified. Generalised contexts include situations where the candidate has to deal with problems in a more general way — eg by creating a model of a situation.

Calculations may be carried out mentally, in writing, or using a calculator or other electronic device — eg a computer. It is assumed that the candidate will be able to add, subtract, multiply, and divide whole numbers and decimals, and to work with fractions, percentages, and ratios as appropriate, but evidence of all of these is not required. Candidates will round answers to an appropriate degree of accuracy — eg to two decimal places or three significant figures. Candidates should check answers, although evidence of checking is not required.

The candidate can show this through:

- solving problems involving one numerical or statistical theory — eg relationships in symbolic form, numbers represented by symbols, or statistical concepts such as standard deviation
- deciding which steps are to be carried out and the order in which to carry them out. At this level, candidates must show that they can solve complex problems. The process of reaching a solution will have several stages, some of which might involve more than one numerical calculation
- carrying out sustained, complex calculations — eg use of formulae in symbolic form; manipulation of symbols; addition/subtraction/multiplication/division of fractions and decimals

Examples of tasks might include:

- calculations involving complex financial data
- in an engineering context, using formulae to calculate the flow of a particular liquid through a pipe
- producing qualitative and quantitative data with impact analysis of intervention, from a local survey
- researching and comparing local data with national statistics — eg on children's health