SCQF level 6
Unit Specification

Researching Chemistry

SCQF: level 6 (3 SCQF credit points)

Unit code: J204 76

Unit outline

The general aim of this Unit is to develop skills of scientific inquiry to undertake research in Chemistry. Candidates will collect and synthesise information from different sources. They will plan and undertake a practical investigation and analyse results.

The Unit offers opportunities for collaborative and independent learning. Candidates will develop skills associated with collecting and synthesising information from a number of different sources. Equipped with knowledge of standard laboratory apparatus, they will plan and undertake a practical investigation related to a chosen chemistry topic.

Candidates who complete this Unit will be able to:

1 Apply skills of scientific inquiry and draw on knowledge and understanding to research the underlying chemistry of a chosen topic.
2 Apply skills of scientific inquiry to investigate, through experimentation, the underlying chemistry of a chosen topic.

This Unit is available as a free-standing Unit. The Unit Specification should be read in conjunction with the Unit Support Notes, which provide advice and guidance on delivery, assessment approaches and development of skills for learning, skills for life and skills for work. Exemplification of the standards in this Unit is given in *Unit Assessment Support*.

Recommended entry

Entry to this Unit is at the discretion of the centre. However, candidates would normally be expected to have attained the skills, knowledge and understanding required by one or more of the following or equivalent qualifications and/or experience:

- National 5 Chemistry Course or relevant Units

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 candidates should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence. For further information, please refer to the *Unit Support Notes.*

Standards

Outcomes and assessment standards

Outcome 1

The learner will:

1 Apply skills of scientific inquiry and draw on knowledge and understanding to research the underlying chemistry of a chosen topic by:

1.1 Gathering and recording information from two sources relating to the chosen topic

Outcome 2

The learner will:

2 Apply skills of scientific inquiry to investigate, through experimentation, the underlying chemistry of a chosen topic by:

2.1 Planning/designing the practical investigation, including safety measures.
2.2 Carrying out the practical investigation safely, recording detailed observations and results including units

Evidence Requirements for the Unit

Assessors should use their professional judgement, subject knowledge and experience, and understanding of their candidates, to determine the most appropriate ways to generate evidence and the conditions and contexts in which they are used.

Evidence can be drawn from a variety of sources and presented in a variety of formats, including participation in group tasks/experiments, written responses to questions, presenting information to other groups, and simple digital presentations.

Evidence may be presented for individual Outcomes or it may be gathered for the Unit as a whole through combining assessment holistically in one single activity. If the latter approach is used, it must be clear how the evidence covers each Outcome.

Outcome 1
Candidates will be provided with a candidate guide and a list of possible topics for investigation.

Candidates will research one of the topics.

Candidates must produce:

- a clear statement describing the research topic.
- a record of at least two sources of information relating to the research topic. These should be identified in sufficient detail to allow a third party to retrieve the source article

Outcome 2
The assessor should record:

- that the learner made an effective contribution to planning
- that the learner made an effective contribution to carrying out the practical work
- that safety concerns were addressed where appropriate
- measurements/observations are recorded appropriately

Exemplification of assessment is provided in Unit assessment support packs. Advice and guidance on possible approaches to assessment is provided in the *Unit Support Notes.*

Transfer of evidence

For the freestanding SCQF Level 6 Researching Chemistry unit (J204 76), where the candidate's evidence meets the standards for the Outcomes and Assessment Standards, this can be used as evidence for Outcome 1 of the Chemical Changes and Structure, Nature's Chemistry and Chemistry in Society freestanding Units, without the need to match the evidence against the Assessment Standards. (The converse does not apply – which means that Chemical Changes and Structure, Nature's Chemistry and Chemistry in Society cannot transfer evidence *into* Researching Chemistry).

This means that where a candidate's record of work or 'daybook' for the Researching Chemistry Unit satisfies the evidence requirements for Outcome 1 Assessment Standard 1.1 and Outcome 2 Assessment Standards 2.1 and 2.2 of that Unit, they can be credited with passing Outcome 1 in the Chemical Changes and Structure, Nature's Chemistry and Chemistry in Society Units. For the vast majority of candidates, ie those who successfully complete the Researching Chemistry Unit assessment, it will therefore be unnecessary to assess Outcome 1 in the other Units. This effectively removes an element of assessment for most candidates and the re-assessment that often accompanies it.

It would only be necessary to assess Outcome 1 of the Chemical Changes and Structure, Nature's Chemistry and Chemistry in Society Units in the case of a candidate who is taking these as standalone Units or who has not passed the Researching Chemistry Unit, if they wish to achieve those Units.

Development of skills for learning, skills for life and skills for work

It is expected that candidates will develop broad, generic skills through this Unit. The skills that candidates will be expected to improve on and develop through the Unit are based on SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work* and drawn from the main skills areas listed below. These must be built into the Unit where there are appropriate opportunities.

1 Literacy

1.2 Writing

2 Numeracy

2.1 Number processes
2.2 Money, time and measurement
2.3 Information handling

5 Thinking skills

5.3 Applying
5.4 Analysing and evaluating
5.5 Creating

Amplification of these is given in SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work.* The level of these skills should be at the same SCQF level of the Unit and be consistent with the SCQF level descriptor. Further information on building in skills for learning, skills for life and skills for work is given in the *Unit Support Notes.*

Appendix: Unit support notes

Introduction

These support notes are not mandatory. They provide advice and guidance on approaches to delivering and assessing this Unit. They are intended for teachers and lecturers who are delivering this Unit. They should be read in conjunction with:

- the *Unit Specification*
- the *Unit Assessment Support packs*

Developing skills, knowledge and understanding

Teachers and lecturers are free to select the skills, knowledge, understanding and contexts which are most appropriate for delivery in their centres.

Approaches to learning and teaching

Candidates should have knowledge of the following pieces of general laboratory apparatus:

- Conical flask
- Beaker
- Measuring cylinder
- Delivery tubes
- Dropper
- Test tubes/Boiling tubes
- Evaporating basin
- Pipette with safety filler
- Burette
- Volumetric flask
- Funnel
- Thermometer

Candidates should be familiar with the following techniques:

- Filtration
- Distillation
- Use of a balance
- Titration
- Methods for the collection of a gas: over water, using a gas syringe
- Safe Methods for heating: Bunsen burners, water baths or heating mantles

Candidates should be familiar with the following apparatus, practical techniques and activities:	Candidates should be able to process experimental results by:
♦ Filtration ♦ Use of a balance ♦ Safe methods of heating ♦ Titration ♦ Preparation of a standard solution ♦ Methods for following rates of reactions ♦ Degree of unsaturation ♦ Chromatography ♦ Organic analysis of structure ♦ Distillation ♦ Solvent extraction ♦ Determining enthalpy ♦ Simple gravimetric analysis, eg weighing a precipitate, weighing by difference ♦ Volumetric analysis	♦ Representing experimental data using a scatter graph. ♦ Sketching lines or curves of best fit. ♦ Calculating averages (means) for experiments. ♦ Identifying and eliminating rogue points from the analysis of results. ♦ Qualitative appreciation of the relative accuracy of apparatus used to measure the volume of liquids. Candidates would be expected to know that the volume markings on beakers provide only a rough indication of volume. While measuring cylinders generally provide sufficient accuracy for preparative work, for analytic work, burettes, pipettes and volumetric flasks are more appropriate. ♦ Appreciating that when a measurement has been repeated, any variations in the value obtained give an indication of the reproducibility of the technique. ♦ Knowing that the uncertainty associated with a measurement can be indicated in the form, *measurement* ± *uncertainty.* Candidates are not expected to conduct any form of quantitative error analysis. ♦ Quantitative mole calculations

Re-assessment

SQA's guidance on re-assessment is that there should be one or, in exceptional circumstances, two re-assessment opportunities. Re-assessment should be carried out under the same conditions as the original assessment. It is at a centre's discretion as to how they re-assess their candidates. Candidates may be given a full re-assessment opportunity, or be re-assessed on individual key areas and/or problem solving skills. Regardless of which option is chosen, candidates must achieve 50% or more of each re-assessment opportunity.

Administrative information

Published: July 2019 (version 3.0)

Superclass: RD

History of changes to National Unit Specification

Version	Description of change	Authorised by	Date
2.0	Level changed from Higher to SCQF level 6. Unit support notes added. Assessment standard threshold added.	Qualifications Manager	September 2018
3.0	Unit code updated	Qualifications Manager	July 2019