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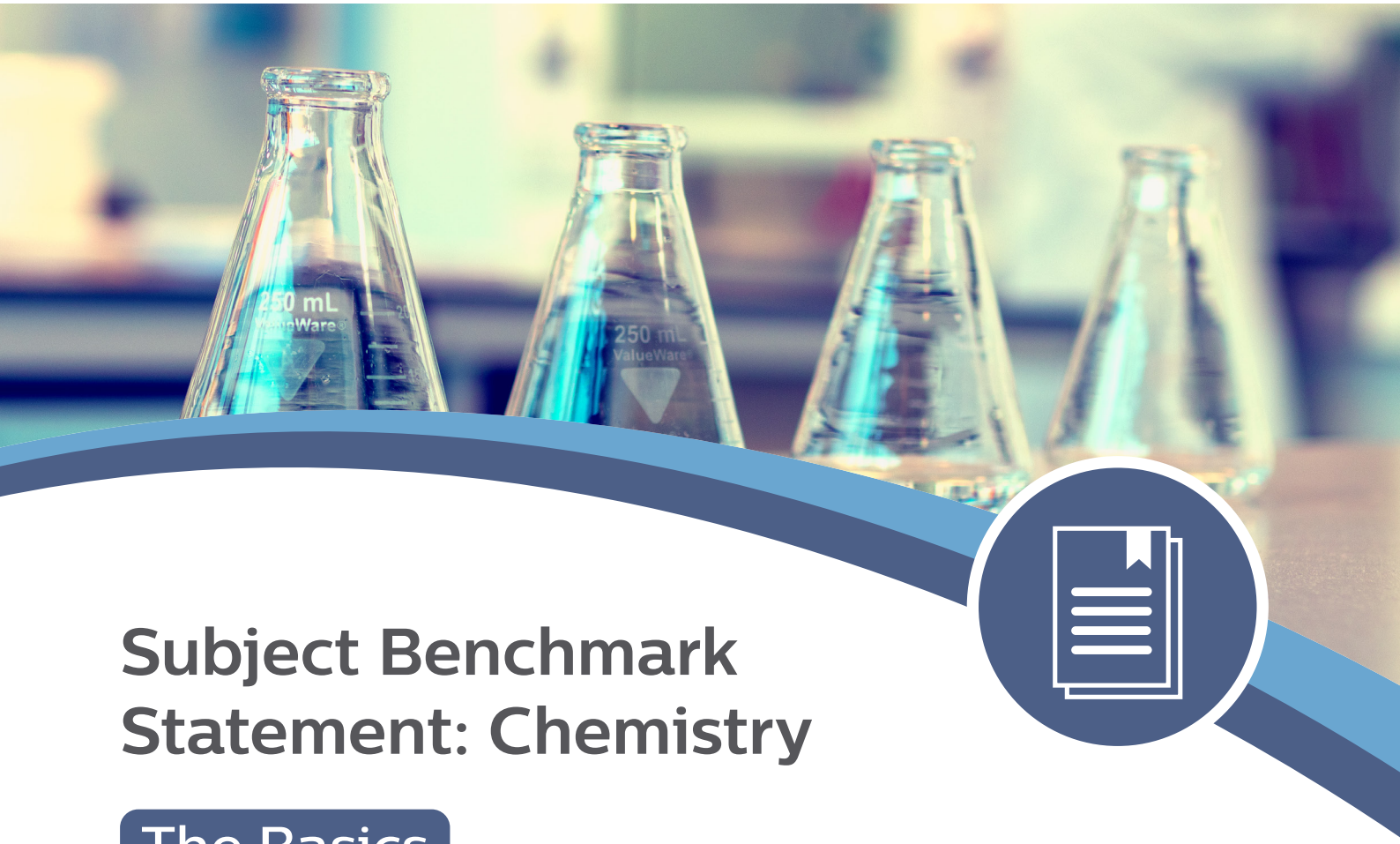

Subject Benchmark Statement: Chemistry

The Basics

This document is a summary of the Subject Benchmark Statement for Chemistry. It is specifically designed to provide a short and accessible overview of the main Statement for students, employers and academics. It is not intended to replace or alter the Subject Benchmark Statement, which should be referred to in the design and approval of courses and when any further detail is required.

Subject Benchmark Statements describe the nature of study and the benchmark academic standards expected of graduates in specific subject areas, and in respect of particular qualifications. They provide a picture of what graduates in a particular subject might reasonably be expected to know, do and understand at the end of their course or programme.

Subject Benchmark Statements are presented in four sections. Section 1 outlines the contextual information - providing the operational landscape, and boundaries, of subject discipline. This includes consideration of the ways in which the discipline addresses wider social goals, specifically in relation to: equality, diversity and inclusion (EDI); the requirements of disabled students; education for sustainable development (ESD); and enterprise and entrepreneurship.

Section 2 covers distinctive features of the course, including curriculum design, partnership arrangements, flexibility of delivery, progression and ongoing monitoring processes. Section 3 explains any features relevant to teaching, learning and assessment activities for the subject. Section 4 describes the benchmark standards of achievement reached by all graduates with a bachelor's degree with honours in the subject, with some subjects also including achievement at master's level.

Why study a degree in Chemistry?

Chemistry is the central science underpinning all aspects of life. It delivers huge societal impacts by allowing us to describe, understand and manipulate the world around us. It will continue to play an essential role in providing society with the toolkit for addressing sustainable development goals and global challenges, from improving health throughout life to clean energy production and storage. Chemistry graduates use their knowledge to gather state-of-the-art scientific information, design investigations to solve problems and disseminate their findings across a wide range of spheres. Studying a bachelor's degree in Chemistry enables student to develop:

- a broad and balanced knowledge and understanding of key chemical concepts
- a range of practical skills so that they can assess and mitigate risks and work safely and competently in the laboratory
- the ability to apply defined methodology to the solution of problems in chemistry
- planning and investigative skills that draw on the existing literature to develop new insights and propose avenues for further exploration
- a knowledge and skills base from which they can proceed to graduate employment or to further studies in chemistry
- an understanding of the interfaces between chemistry and other subjects in which chemical approaches contribute to progress.

More generally, degree courses in Chemistry:

- establish in students an appreciation of the importance and sustainability of the chemical sciences in industrial, academic, economic, environmental and social contexts
- inspire and enthuse students with the power and utility of using chemical approaches to solving personal, human and global challenges
- highlight the importance of the multidisciplinary nature of chemistry by examining how it articulates with different disciplines and enables students to situate and deploy their knowledge and skills effectively within this wider context
- develop in students the skills needed for employment in chemical and non-chemical roles which require the exercise of professionalism, independent thought, personal responsibility and decision-making in complex and unpredictable circumstances.

What are the main teaching and learning approaches in chemistry?

A wide range of teaching methodologies, both innovative and well-established, are appropriate to the teaching of chemistry, recognising that, among other features, the subject retains a strong visual and practical component. The tools selected are very much customised to the needs of the material, which is diverse in kind, requiring varying proportions of verbal, quantitative and spatial skills to be deployed during learning. Current strategies aim to be student-centred, utilising a range of delivery methods, as appropriate. Synchronous learning activities may include lectures; problem classes, workshops, seminars and tutorials; laboratory classes; computer workshop sessions; case studies and problem-based learning; peer and collaborative learning; interactive sessions, including debates and oral/poster presentations; field work and visits. Asynchronous learning materials and activities may include textbooks; digital media resources; recordings of taught sessions and practical demonstrations; computer modelling and simulations; virtual and remote experiments; diagnostic and practice tests and exercises; pre-laboratory and pre-sessional exercises; other self-study materials. Blended and multi-modal approaches may also be used in courses.

How are students assessed?

The assessment of students aligns with learning outcomes and is appropriate to the knowledge, abilities, academic and professional skills that the course aims to develop. The diversity of assessment deployed across chemistry courses should reflect this.

Typical forms of assessment may include: examinations (seen or unseen, open book or without learning materials); laboratory reports; problem-solving exercises; oral presentations and examinations, viva voce and poster defence; project work (including research proposals and aspects of the dissertation); literature surveys and evaluations; outputs from collaborative work; essay assignments; portfolios of chemical activities undertaken (for example, wikis); preparation and display of posters or electronic visual media; reflective and scientific reports on external placements; peer assessment; reflective logs; production of online and other media outputs such as video and audio; and practical skills assessments based on outcomes (yield, accuracy, precision) achieved.

Benchmark Standards

The minimum threshold standards that a student will have demonstrated when they are awarded an honours degree in Chemistry are outlined on **pages 16-19** of the Subject Benchmark Statement. The vast majority of students will perform significantly better than the minimum threshold standards. Each higher education provider has its own method of determining what appropriate evidence of this achievement will be and should refer to Annex D: Outcome classification descriptions for FHEQ Level 6 and FQHEIS Level 10 degrees. This Annex sets out common descriptions of the four main degree outcome classifications for bachelor's degrees with honours: 1st, 2:1, 2:2 and 3rd. Study at master's level requires higher level skills, with students expected to achieve according to the descriptor for a higher education qualification at Level 7 on the FHEQ and SCQF Level 11 on the FQHEIS.

The Statement was developed by a group of subject experts drawn from across the sector. Details of the Advisory Group can be found on **page 21** of the Statement.

Read the full Subject Benchmark Statement

The full Subject Benchmark Statement is available on the QAA website.

Subject Benchmark Statements are published in QAA's capacity as a membership organisation on behalf of the higher education sector.

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