Threshold Learning Outcomes for Science

(as specified in the LTAS booklet September 2011)

	Upon completion of a bachelor degree in science, graduates will:
Understanding science	*1. Demonstrate a coherent understanding of science by:* 1.1 articulating the methods of science and explaining why current scientific knowledge is both contestable and testable by further inquiry. 1.2 explaining the role and relevance of science in society.
Scientific knowledge	*2. Exhibit depth and breadth of scientific knowledge by:* 2.1 demonstrating well-developed knowledge in at least one disciplinary area. 2.2 demonstrating knowledge in at least one other disciplinary area.
Inquiry and problem solving	*3. Critically analyse and solve scientific problems by:* 3.1 gathering, synthesising and critically evaluating information from a range of sources. 3.2 designing and planning an investigation. 3.3 selecting and applying practical and/or theoretical techniques or tools in order to conduct an investigation. 3.4 collecting, accurately recording, interpreting and drawing conclusions from scientific data.
Communication	*4. Be effective communicators of science by:* 4.1 communicating scientific results, information, or arguments, to a range of audiences, for a range of purposes, and using a variety of modes.
Personal and professional responsibility	*5. Be accountable for their own learning and scientific work by:* 5.1 being independent and self-directed learners. 5.2 working effectively, responsibly and safely in an individual or team context. 5.3 demonstrating knowledge of the regulatory frameworks relevant to their disciplinary area and personally practising ethical conduct.

Chemistry Threshold Learning Outcome Statements

(as specified in the LTAS booklet September 2011)

	Upon completion of a bachelor degree with a major in chemistry, graduates will be able to:
Understanding the culture of chemistry	*Understand ways of scientific thinking by*: • demonstrating a knowledge of, and applying the principles and concepts of chemistry • recognising that chemistry is a broad discipline that impacts on, and is influenced by, other scientific fields • recognising that chemistry plays an essential role in society and underpins many industrial, technological and medical advances • recognising the creative endeavour involved in acquiring knowledge, and the testable and contestable nature of the principles of chemistry.
Inquiry, problem solving and critical thinking	*Investigate and solve qualitative and quantitative problems in the chemical sciences, both individually and in teams, by*: • formulating hypotheses, proposals and predictions and designing and undertaking experiments in a safe and responsible manner • applying recognised methods and appropriate practical techniques and tools, and being able to adapt these techniques when necessary • collecting, recording and interpreting data and incorporating qualitative and quantitative evidence into scientifically defensible arguments • synthesising and evaluating information from a range of sources, including traditional and emerging information technologies and methods.
Communication	*Communicate chemical knowledge by*: • appropriately documenting the essential details of procedures undertaken, key observations, results and conclusions • presenting information, articulating arguments and conclusions, in a variety of modes, to diverse audiences, and for a range of purposes.
Personal and social responsibility	*Take personal, professional and social responsibility by*: • recognising the relevant and required ethical conduct and behaviour within which chemistry is practised • demonstrating a capacity for self-directed learning • demonstrating a capacity for working responsibly and safely • understanding and being able to articulate aspects of the place and importance of chemistry in the local and global community.

Concordance between Science TLOs and Chemistry TLOs

(ordered by Chemistry TLO)

Chemistry TLO	Science TLO
1.1	2.1
1.2	2.2
1.3	1.2
1.4	1.1
2.1	3.2
2.2	3.3
2.3	3.4
2.4	3.1
3.1	
3.2	4.1
4.1	5.3
4.2	5.1
4.3	5.2
4.4	1.2

(ordered by Science TLO)

Chemistry TLO	Science TLO
1.4	1.1
1.3	1.2
4.4	1.2
1.1	2.1
1.2	2.2
2.4	3.1
2.1	3.2
2.2	3.3
2.3	3.4
3.1	
3.2	4.1
4.2	5.1
4.3	5.2
4.1	5.3

Chemistry Threshold Learning Outcome Statements

(after realignment to match order of Science TLOs, October 2012)

	Upon completion of a bachelor degree with a major in chemistry, graduates will be able to:
Understanding the culture of chemistry	*1. Understand ways of scientific thinking by*: 1.1 recognising the creative endeavour involved in acquiring knowledge, and the testable and contestable nature of the principles of chemistry 1.2 recognising that chemistry plays an essential role in society and underpins many industrial, technological and medical advances 1.3 understanding and being able to articulate aspects of the place and importance of chemistry in the local and global community
Scientific knowledge	*2. Exhibit depth and breadth of chemistry knowledge by*: 2.1 demonstrating a knowledge of, and applying the principles and concepts of chemistry 2.2 recognising that chemistry is a broad discipline that impacts on, and is influenced by, other scientific fields
Inquiry, problem solving and critical thinking	*3. Investigate and solve qualitative and quantitative problems in the chemical sciences, both individually and in teams, by*: 3.1 synthesising and evaluating information from a range of sources, including traditional and emerging information technologies and methods 3.2 formulating hypotheses, proposals and predictions and designing and undertaking experiments in a safe and responsible manner 3.3 applying recognised methods and appropriate practical techniques and tools, and being able to adapt these techniques when necessary 3.4 collecting, recording and interpreting data and incorporating qualitative and quantitative evidence into scientifically defensible arguments
Communication	*4. Communicate chemical knowledge by*: 4.1 presenting information, articulating arguments and conclusions, in a variety of modes, to diverse audiences, and for a range of purposes 4.2 appropriately documenting the essential details of procedures undertaken, key observations, results and conclusions
Personal and social responsibility	*5. Take personal, professional and social responsibility by*: 5.1 demonstrating a capacity for self-directed learning 5.2 demonstrating a capacity for working responsibly and safely 5.3 recognising the relevant and required ethical conduct and behaviour within which chemistry is practised