School Science Laboratory Technicians
National Standards for Professional Practice 2014

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This forum and the workshop were funded by the Australian Government Department of Education, Employment and Workplace Relations.

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It is intended that these standards will operate as a living document, which will be improved upon in response to changes in policy or to issues as they arise.

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CONTEXT

It is vital for the delivery of practical, hands on, science education that teachers are well resourced to support the *Australian Curriculum: Science,* in particular the Science Inquiry Skills strand. This focus on student initiated investigations and inquiry based learning places greater onus on the technical support afforded teachers of science and requires increased levels of paraprofessional support particularly by school science technicians.

School science technicians work alongside teachers supporting the delivery of practical and inquiry based science education. They provide technical assistance and expertise regarding health and safety requirements, legislative compliance and manage the resources necessary for all science laboratory practical activities. High level technical support increases the quality of a school science program, so it is an advantage to the school to have well trained technicians.

Specialist knowledge and skills are required to work in the science area of a school. It is important that staff have received appropriate training in order to safely support school science. For example, due to the wide range of hazardous chemicals maintained in the school science chemical store, it is essential that relevant training is provided regarding the types of hazardous chemicals and the correct handling procedures. This includes training in the use of personal protective equipment to minimise the risk to the person's safety and health and a site specific induction prior to commencing work.

Allocation of sufficient staffing time for the position of school science technician is critical in order to perform all of the required tasks to effectively and safely support practical science in schools.

BACKGROUND

Concerns about the status of technical support for science teaching programs in Australian schools expressed by the Australian Science Teachers Association (ASTA) and Science Education Technicians Australia (SETA) led to the Australian Government through its Department of Education, Employment and Workplace Relations funding a study to investigate the training and support for technicians, their roles and the level of servicing provided by technicians for the teaching and learning of secondary science.

The research: "*The Status of School Science Technicians in Australian Schools"* identified many issues in Australia's current systems including: inadequate service factors, training levels, career opportunities and safety risks. These concerns lead to the conclusion that the existing system is generally not well equipped to meet the new challenges of the implementation of the Australian Curriculum: Science. (Hackling, 2009)

The report made eight recommendations which address training programs aligned with the needs of the educational sector, minimum standards for training and induction into the role, consistent job specifications, availability and support for ongoing professional development, minimum standards for staffing levels defined by a technicians' service factor and the establishment of an online advisory service. (Hackling, 2009)

This Working Party was formed at July 2010 National Forum and sought to set out a national template for the professional standards, career structures and consistent job specifications for school science technicians that will support the good teaching of Science in schools, and facilitate the successful implementation of the Australian Curriculum: Science. (ASTA 2010)

The standards were developed after reviewing existing structures in jurisdictions and sectors from across the country. The Working Party noted significant variation between employers and attempted to identify a structure that would suit the professional needs of technicians, at the same time being easy to adopt by employers in all States and Territories.

PURPOSE

It is intended that by 2015 these Standards be adopted and implemented by all employers of school laboratory technicians: government Departments of Education, Catholic and Independent schools authorities and non-systemic schools.

The articulation and adoption of these standards will:

1. Provide a research based, national approach to an academic recognition of the immense diversity of technicians' skills, knowledge and expertise.

2. Encourage all technicians to engage in professional learning throughout their career.

3. Encourage employers to provide ongoing professional learning opportunities to enable all technicians to remain current with legislative requirements, new and emerging technologies, as well as supporting curriculum requirements. This ongoing support is seen as essential to ensuring high quality technical support for teachers in their attempt to develop engaging, enquiry based learning experiences.

4. Allow technicians to access high levels of job satisfaction and improve the status of technicians within the broader education community.

5. Provide a common language for professional dialogue between technicians, science educators, professional associations, employers, unions and the public. It makes explicit the knowledge, skills, and practice for technicians to play an effective role in the education of students. The Standards should reflect the current and growing expertise, career aspirations and achievements of all school science technicians

6. Provide a transparent structure for accrediting technicians at appropriate stages of their career. It is expected that mechanisms be put in place to fund and support technicians currently in the role to access training and/or recognition of current competencies to gain formal qualifications. It is also expected that suitable levels of remuneration will be linked to these standards.

This document describes:

a) Minimum standards for technician servicing of secondary science programs
b) Minimum standards for the training required for employment of science technicians in secondary schools and for their induction into the role
c) A career structure that recognizes the development of skills and experience
d) Nationally consistent job specifications for various levels of science technicians to which appropriate salary scales would be linked

Please note: It is beyond the scope of this document to describe mechanisms for the delivery of training relevant to the educational setting; training packages and accreditation for recognition of skills and prior learning.

SERVICE FACTOR

It is intended that by 2015 school laboratory technicians are allocated sufficient time to perform all of the required tasks to effectively support practical science in schools as required in the Australian Curriculum.

The Royal Society and the Association for Science Education (2001) developed a service factor and described the standard of service that would be provided for different levels of service factor (see appendix 3). The service factor is calculated as follows:

$$\text{Service Factor} = \frac{\text{Technician hours per week}}{\text{Hours of science teaching per week}}$$

Technician hours per week are the sum of hours of employment in one week of all technicians working at that school during term time. This is regardless of the number of students at the school.

The hours of science teaching per week is the sum of hours of science teaching per week for all secondary classes at that school

The report by Hackling recommended that the minimum service factor in Australian schools be set at 0.6. A higher service factor of 0.85 is recommended for senior secondary schools plus additional hours for schools with circumstances that reduce efficiency such as diverse locations of laboratories, preparation areas and storerooms, absence of a lift where there are multiple levels, buildings undergoing construction and other disruptions to the work areas.

In addition to term time allocation of technician hours, employment during school holidays enables tasks such as stocktaking, housekeeping and maintenance and repairs to be undertaken.

SUMMARY OF STANDARDS

DOMAIN	STANDARD
Professional Knowledge	1. Understand relevant scientific concepts
	2. Possess technical knowledge
	3. Familiar with legislative requirements
	4. Possess administrative knowledge
Professional Practice	5. Deliver practical aspects of the science curriculum
	6. Create and maintain safe, efficient and supportive science teaching environments
	7. Practice sound laboratory techniques
	8. Facilitate the construction, maintenance and repair of the equipment
	9. Contribute to the administrative management of the school science department
Professional Attributes	10. Demonstrate effective communication and interpersonal skills
	11. Engage in relevant ongoing professional learning and reflection
	12. Work collegially within the school community and wider professional communities

ORGANISATION OF STANDARDS

The Standards have been aligned with the ASTA National Professional Standards for Highly Accomplished Teachers of Science (ASTA, 2002) and the Professional Standards for Teachers published by the Australian Institute of Teaching and School Leadership (AITSL, 2011).

The Science Technician Standards are organised into three domains: Professional Knowledge, Professional Practice and Professional Attributes, which are interconnected and overlap. Within the domains, standards identify the main components of what technicians should know and be able to do. Descriptors provide an indication of how the standards will apply at each level of capability.

This document sets out a 3 tier classification structure plus trainee level, to establish a career structure for school science technicians and a workable model that can accommodate the range of schools, from small remote schools to large urban schools. They also provide a continuum of professional expertise throughout the technician's career.

DOMAINS OF LABORATORY PRACTICE

To be effective members of the faculty, who can impact both directly and indirectly on the quality of student learning, school science technicians work in all three domains. It is acknowledged that some schools employ subject specialist technicians for specific disciplines within the subject matter of science, for example chemistry. These technicians would not be expected to operate with a comprehensive knowledge of other subject specialist areas of science. Whilst the majority of technicians need a general knowledge base it would not be expected that all technicians have in depth knowledge of all disciplines.

Domain 1: Professional Knowledge

Technicians have a fundamental understanding of the basic scientific concepts being taught in schools and are familiar with the content of the Australian Curriculum: Science. Without this body of knowledge they will not be able to provide effective support for the teachers. To perform their duties effectively technicians have well developed knowledge of the techniques and processes needed to operate within a laboratory setting. An essential part of the specialist knowledge is an understanding of legislative requirements by which activities in schools are bound. Technicians have knowledge of administration systems necessary for managing the faculty's resources.

Domain 2: Professional Practice

The demands placed on technicians are varied and require high levels of skill development. Technicians apply their knowledge in a practical way to a wide range of situations that arise within the faculty. They possess an extensive repertoire of laboratory skills to enable them to provide practical and technical support to teachers so that they in turn can provide a wide range of educational experiences to effect high level learning outcomes for all students. They ensure that all equipment and resources provided to teachers are well maintained and are appropriate to the learning outcome. Technicians provide guidance on safety matters to teachers and effectively manage the practical resources of the science department.

Domain 3: Professional Attributes

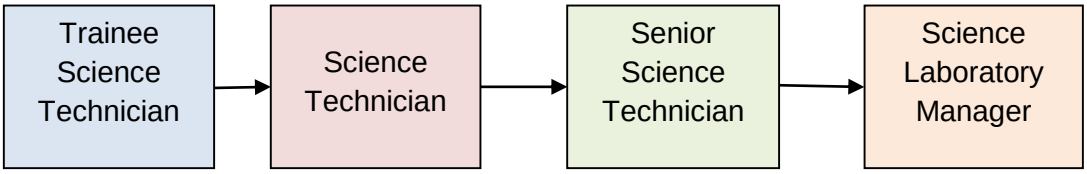
Technicians are effective communicators and continuously reflect on, evaluate, improve and share their professional knowledge and practice with technicians, teachers and students. They engage in professional learning both individually and collegially to enhance their knowledge and practice. As members of the science faculty technicians liaise with suppliers in the identification, recommendation and purchase of appropriate resources and equipment. As members of the wider school community, technicians also associate with other professional officers within the school in a manner that supports the wellbeing of all staff and students.

STANDARDS AND DESCRIPTORS

The standards identify what technicians know and are able to do. Technicians should use the standards as a guide for their professional development as they attempt to move along this career path. Descriptors are a statement of the identified components of each standard relevant to each level. They outline the professional actions technicians engage in as they apply their professional knowledge, skills and attributes to their specific contexts.

LEVELS OF CLASSIFICATION

The Standards describe the role of science technicians in the education sector and what is required of technicians at three levels of classification plus trainee:



	Trainee	Science Technician	Senior Science Technician#	Science Laboratory Manager
Level of Autonomy	Undertakes specific and defined tasks within established rules under close supervision	Provides standard services within a defined service delivery framework under general supervision	Delivers a range of services in complex situations working autonomously under limited direction and instruction	Determines operational service delivery plans based on accepted standards working with a high degree of autonomy
Minimum Qualifications	Noneø	Certificate III in Laboratory Skills* or relevant experience	Certificate IV in Laboratory Techniques* with significant relevant experience	Certificate IV in Laboratory Techniques* and extensive relevant experience in an educational setting
Preferred Qualifications	Working towards Certificate III in Laboratory Skills	Certificate IV in Laboratory Techniques* with relevant experience	Diploma of Laboratory Technology* with significant relevant experience in an educational setting	Diploma of Laboratory Technology* and extensive relevant experience in laboratory work in an educational setting

This is the minimum employment level for a sole technician in a school
Ø It is essential that prior to commencing work, an induction relevant to safe laboratory practice specific to the school science setting as well as a site specific induction is conducted.
*Or equivalent qualification
Note: Qualifications in First Aid; Frontline Management; and/or Occupational Health and Safety are advantageous

This structure provides a career pathway for technicians and ensures that all who work and study in schools are adequately supported and protected. The Standards require that employers ensure that all technicians will be appropriately trained to perform the duties that they have been employed to do. The structure has been designed to meet the needs of all jurisdictions and sectors across Australia.

Trainee Science Technician

This is the minimum entry level for someone coming into the profession. It is intended to be a training position and therefore of a short term nature only. It could include work placement students from tertiary institutions. When all training has been successfully completed the trainee must immediately be re-classified as a Science Technician. As this is an entry level position, employees working as a Trainee Science Technician must work under close supervision of a Senior Science Technician or Science Laboratory Manager. A Trainee Science Technician position should only be created for the purpose of training a person to continue in laboratory work and it would be expected that a training plan would be in place for the duration of such a position. Personnel working at this level should be undertaking a Certificate III in Laboratory Skills or equivalent qualification.

There are no requirements for qualifications at this level apart from those required by the institution providing the training.

Science Technician

This is the first level of classification for qualified Science Technicians in schools. Technicians working at this level will have completed entry level training and be expected to demonstrate a degree of autonomy in carrying out their duties. This position requires general supervision by a Senior Science Technician or Science Laboratory Manager. This is not the position of a sole technician in a school as some of the duties and responsibilities for a sole technician would be beyond reasonable expectations for this level.

A Science Technician would be expected to have completed a minimum of Certificate III in Laboratory Skills (or equivalent qualification) or relevant experience in a related field and be working towards a Certificate IV in Laboratory Techniques (or equivalent). The preferred qualification would be a Certificate IV in Laboratory Techniques (or equivalent) with relevant experience.

Senior Science Technician

This is the minimum employment level for a sole technician in any school as this position requires a high level of expertise, experience and qualifications. The Senior Science Technician is expected to work autonomously under limited direction and instruction, delivering a range of services in complex situations. Although not a requirement of this level, they may be responsible for the supervision of Trainee Science Technicians and Science Technicians if any are employed.

A Senior Science Technician would be expected to have a Certificate IV in Laboratory Techniques (or equivalent qualification) with significant relevant experience. The preferred qualification would be a Diploma of Laboratory Technology* (or equivalent qualification) with significant relevant experience in an educational setting.

Science Laboratory Manager

This position in a school requires significant experience, expertise, qualifications and managerial skills in systems, resources and personnel. The Science Laboratory Manager requires a high degree of autonomy receiving minimal direction and instructions. Although not a requirement of this level, they may have responsibility for supervising; training and directing the work of Trainee Science Technicians, Science Technicians and Senior Science Technicians if any are employed.

A Science Laboratory Manager would be expected to have a Certificate IV in Laboratory Techniques (or equivalent qualification) and extensive experience in an educational setting. The preferred qualification would be a Diploma of Laboratory Technology (or equivalent qualification) and extensive relevant experience in laboratory work in an educational setting.

GRANDFATHER CLAUSE

The Working Party recognized that there are existing highly competent school science technicians without post-secondary science related qualifications who have developed their knowledge and skills through “on the job training”.

It is not the intent of this paper to suggest that these technicians need to undertake retraining to continue working in these existing positions, nor for these technicians to be limited to being classified as trainees. It is expected that a recognition of current competencies approach would ensure that currently employed technicians with considerable knowledge and experience can be assessed as having already attained the specified standards and be classified for remuneration at that particular level.

It is the intent of the document to ensure that technicians entering the profession in the future will have relevant qualifications before entering the workplace, or at a minimum are provided with appropriate training on taking up their position at the educational institution to enable them to progress through this career pathway.

RURAL AND REMOTE SCHOOLS

In developing these draft Professional Standards the Working Party was intently aware of the particular challenges faced by a large number of rural and remote schools that exist in many parts of Australia. These schools experience significant problems in trying to deliver quality Science programs due to their size, geographical isolation, failure to attract qualified staff and lack of access to ongoing professional development.

Please Note: These standards describe best practice and it is acknowledged that rural and remote schools face challenges in attracting qualified staff. If schools in these situations employ a Trainee Science Technician or a Science Technician, in the absence of a Senior Science Technician or a Science Laboratory Manager, it is essential that these staff are supervised by competent and trained staff.

They should also be provided with opportunities by their employer to access

- relevant training in order to
    - maintain their personal safety
    - to develop skills necessary to support the teaching of science
    - to progress to Senior Science Technician level or Science Laboratory Manager level
- reliable and correct source(s) of advice on procedural issues
- school science technician networks
- the National Online Advisory Service

Descriptors of the Standards

The following tables detail the descriptors of the Standards. In determining the appropriate science technician level of employment, it is not a requirement that a level meets every descriptor listed. However the position should be considered on a "whole of job" basis and a majority of descriptors applicable used to determine the classification of "best fit".

DOMAIN 1: PROFESSIONAL KNOWLEDGE

1. Understand relevant scientific concepts *(See Appendix 2 for elaborations)*

Descriptor	Trainee Science Technician	Science Technician	Senior Science Technician	Science Laboratory Manager
1.1 Science Concepts	Develops a fundamental understanding of • Physical • Chemical • Biological • Earth, Environment and Space core science concepts as they apply to the relevant Science curriculum	Acquires a fundamental understanding of • Physical • Chemical • Biological • Earth, Environment and Space core science concepts as they apply to the relevant Science curriculum	Possesses a general understanding of • Physical • Chemical • Biological • Earth, Environment and Space core science concepts as they apply to the relevant Science curriculum	Possesses a general understanding of • Physical • Chemical • Biological • Earth, Environment and Space core science concepts as they apply to the relevant Science curriculum
1.2 Content of the Australian Curriculum: Science	Develops an appreciation of the three K- 10 strands and their sub strands: • Science Understanding • Science as a Human Endeavour • Science Inquiry Skills in addition to the required Senior Secondary subjects.	Acquires a fundamental understanding of the three K- 10 strands and their sub strands: • Science Understanding • Science as a Human Endeavour • Science Inquiry Skills in addition to the required Senior Secondary subjects.	Possesses a fundamental understanding of the three K- 10 strands and their sub strands: • Science Understanding • Science as a Human Endeavour • Science Inquiry Skills in addition to the required Senior Secondary subjects.	Possesses a fundamental understanding of the three K- 10 strands and their sub strands: • Science Understanding • Science as a Human Endeavour • Science Inquiry Skills in addition to the required Senior Secondary subjects.

Note: Employers should provide opportunities for technicians to have access to Professional Learning which will expand their scientific knowledge; knowledge of the Australian Curriculum: Science and specialist science areas.

2. Possess technical knowledge *(See Appendix 2 for elaborations)*

Descriptor	Trainee Science Technician	Science Technician	Senior Science Technician	Science Laboratory Manager
2.1 Technical knowledge of science equipment used in Schools	Acquires the fundamental technical knowledge, safe work practices and standard operating procedures required to identify and operate science equipment	Develops the technical knowledge, safe work practices and standard operating procedures required to operate science equipment	Possesses a broad knowledge of the technical knowledge, safe work practices and standard operating procedures required to operate science equipment	Possesses a comprehensive knowledge of the technical knowledge, safe work practices and standard operating procedures required to operate science equipment. Able to inform and recommend alternative equipment.
2.2 Technical knowledge in the other areas including ICT & AV as applied to science programs	Acquires the fundamental technical knowledge required to operate equipment associated with science education, including computer applications	Develops the technical knowledge required to operate equipment associated with science education, including computer applications	Possesses specialised knowledge required to operate equipment associated with science education, including computer applications .	Possesses specialised knowledge required to operate equipment associated with science education, including computer applications

Note: Employers should provide opportunities for technicians to have access to Professional Learning in current and new technologies

3. Familiar with legislative requirements *(See Appendix 2 for elaborations)*

Descriptor	Trainee Science Technician	Science Technician	Senior Science Technician	Science Laboratory Manager
3.1 WHS Acts, Regulations, Codes of Practice, Standards	Develops an awareness of • WHS Act, Regulations and relevant Codes of Practice • The school's safety policies and procedures • Risk Assessment and Hazard Management Requirements for the Science Area	Acquires a fundamental working knowledge of • WHS Act, Regulations and relevant Codes of Practice • The school's safety policies and procedures • Risk Assessment and Hazard Management Requirements for the Science Area	Possesses a working knowledge of • WHS Act, Regulations and relevant Codes of Practice • The school's safety policies and procedures • Risk Assessment and Hazard Management Requirements for the Science Area .	Possesses a broad knowledge of of • WHS Act, Regulations and relevant Codes of Practice • The school's safety policies and procedures and may assist with reviews • Risk Assessment and Hazard Management Requirements for the Science Area
3.2 Safety in Science Subject Areas	Develops an understanding of • Chemical Safety in Science • Biological Safety in Science • Physics Safety in Science	Acquires a fundamental working knowledge of • Chemical Safety in Science • Biological Safety in Science • Physics Safety in Science	Possesses a working knowledge of • Chemical Safety in Science • Biological Safety in Science • Physics Safety in Science	Possesses a broad knowledge of • Chemical Safety in Science • Biological Safety in Science • Physics Safety in Science
3.3 Licensing Requirements (e.g. animal ethics; flora and fauna licences)	Develops an understanding of the legislative requirements for the ethical use and care of animals, as well as other relevant licencing requirements.	Acquires knowledge of the legislative requirements for the ethical use and care of animals, as well as other relevant licencing requirements.	Possesses a working knowledge of the legislative requirements for the ethical use and care of animals, as well as other relevant licencing requirements.	Possesses a broad knowledge of the legislative requirements and application procedures for the ethical use and care of animals, as well as other relevant licencing requirements.

Note: Employers should provide opportunities for technicians to have access to Professional Learning in current legislative compliance requirements

4. Possess administrative knowledge *(See Appendix 2 for elaborations)*

Descriptor	Trainee Science Technician		Science Technician	Senior Science Technician	Science Laboratory Manager
4.1 Stock control and purchasing procedures	Learns basic stock control and purchasing procedures		Develops their knowledge of stock control and purchasing procedures	Possesses knowledge of stock control and purchasing procedures	Possesses knowledge of and may train others in stock control and purchasing procedures
4.2 Budgets	Learns basic money managing systems used in school science departments		Develops their knowledge of money managing systems used in school science departments	Possesses knowledge of money managing systems used in school science departments	Possesses knowledge of and may train others in money managing systems used in school science departments
4.3 Personnel	Learns how to establish and maintain professional working relationships with other school personnel		Knows how to establish and maintain professional working relationships with other school personnel	Knows how to establish and maintain professional working relationships with other school personnel	Knows how to establish and maintain professional working relationships with other school personnel Understands how to manage personnel and may assist in the processes used in advertising for, interviewing and selecting new staff
4.4 Timetabling	Learns how to read science faculty timetables		Knows how to read science faculty timetables	Knows and understands the operation of science faculty timetables	Knows and understands the operation of science faculty timetables and able to suggest changes for best use of facilities in response to changing circumstances
4.5 Chemical management systems	Learns how to access and understand chemical management systems		Develops knowledge of how to access, understand and maintain chemical management systems	Possesses knowledge of how to access, understand and maintain chemical management systems	Knows and may train others how to access, understand and maintain chemical management systems

Note: Employers should provide opportunities for technicians to have access to Professional Learning in administration systems.

DOMAIN 2: PROFESSIONAL PRACTICE

5. Deliver practical aspects of the science curriculum *(See Appendix 2 for elaborations)*

Descriptor	Trainee Science Technician	Science Technician	Senior Science Technician	Science Laboratory Manager
5.1 Preparation of materials and equipment for practical activities	Develops skills in recognizing and collating equipment	Assists with preparing, collating and purchasing of materials and equipment	Prepares, collates and purchases materials and equipment	Prepares, collates and purchases materials and equipment. Gives guidance and may suggest alternatives regarding the suitability of materials and equipment
5.2 Demonstration of practical activities and skills to students, teachers	Not applicable	Develops skills in demonstration of practical activities and skills to students, teachers	Demonstrates practical activities and skills to students, teachers	Demonstrates and suggests relevant practical activities and skills to students, teachers
5.3 Development of appropriate practical activities	Not applicable	Assists with the trialling of experiments	Trials experiments and develops appropriate practical activities	Assesses, designs and develops appropriate practical activities
5.4 Sourcing and making equipment	Develops skills in sourcing and making equipment	Assists with the sourcing and making of equipment	Sources and makes equipment	Designs, sources and makes equipment
5.5 Care of flora and fauna	Develops skills in basic care of flora and fauna	Assists in the care of flora and fauna	Supports the compliance of procedures for the care of flora and fauna	Supports the compliance of procedures for the care of flora and fauna and provides guidance on the selection, provision and procurement
5.6 Management of microbiological materials	Undertakes training and develops skills in the preparation and disposal of microbiological materials	Assists in the preparation and disposal of microbiological materials	Supports the compliance of procedures for the preparation and disposal of microbiological materials	Supports the compliance of procedures for the preparation and disposal of microbiological materials and provides guidance on the selection and sourcing of microbiological materials according to safe practice

Note: Employers should provide opportunities for technicians to have access to Professional Learning in practical science education

6. Create and maintain safe, efficient and supportive science teaching environments

Descriptor	Trainee Science Technician	Science Technician	Senior Science Technician	Science Laboratory Manager
6.1 Safe work practices	Undertakes training in safe work practices and follows instructions to maintain a safe work environment	Follows safe work practices to maintain a safe work environment	Supports the compliance of work practices to maintain a safe work environment	Supports the compliance of work practices to maintain a safe work environment and may train others in safe work practices
6.2 Risk Assessment and Hazard Management	Undertakes training in risk assessment control measures to minimise hazards	Applies risk assessment control measures to minimise hazards	Identifies hazards, and applies appropriate risk assessment control measures to minimize hazards	Identifies hazards, undertakes risk assessments and may design appropriate control measures to minimize hazards
6.3 Safety audits	Under direction participate in safety audits	Assist in the safety audit process	Carry out safety audits of the science facilities following the school's policy	Ensure regular safety audits are undertaken in science May have input in developing a safety audit policy and procedures.
6.4 Provide appropriate guidance on safety issues	Not applicable	Convey instructions on safety matters to co-workers, teachers and students regarding practical activities	Provide information and instructions on safety matters to co-workers, teachers and students regarding practical activities	Provide guidance and may train others on safety matters to co-workers, teachers and students regarding practical activities.
6.5 Chemical Safety systems in Science	Undertakes training in chemical safety systems	Follows chemical safety procedures	Supports the compliance of chemical safety procedures and systems	Supports the compliance of chemical safety procedures and systems and may train others in these systems
6.6 Biological Safety	Undertakes training in procedures for the safe handling, storage and disposal of biologically hazardous materials	Follows procedures for the safe handling, storage and disposal of biologically hazardous materials	Supports the compliance of procedures for the safe handling, storage and disposal of biologically hazardous materials	Supports the compliance of procedures for the safe handling, storage and disposal of biologically hazardous materials and may train others in these procedures
6.7 Housekeeping and organisation	Follow directions to maintain laboratory/laboratories in good order	Assist to maintain laboratory/laboratories in good order	Follow systems to maintain laboratory/laboratories in good order	May develop systems of work and provide guidance on maintaining laboratory/laboratories in good order

Note: Employers should provide opportunities for technicians to have access to Professional Learning in safe work practice.

7. Practice sound laboratory techniques *(See Appendix 2 for elaborations)*

Descriptor	Trainee Science Technician	Science Technician	Senior Science Technician	Science Laboratory Manager
7.1 Laboratory techniques in the use of science equipment	Undertakes training and develops skills in using and operating specialist science equipment	Demonstrates basic skills in using and operating specialist science equipment	Demonstrates skills in using and operating specialist science equipment	Demonstrates skills and may provide advice or train others in using and operating specialist science equipment
7.2 Other areas including ICT & AV as applied to science programs	Undertakes training and develops skills in basic applications	Develops skills in basic applications	Demonstrates skills in basic and intermediate applications	Demonstrates skills and may inform others in a range of applications

8. Facilitate the construction, maintenance and repair of the equipment

Descriptor	Trainee Science Technician	Science Technician	Senior Science Technician	Science Laboratory Manager
8.1 Maintain and clean equipment e.g. microscopes, balances	Learns how to operate and clean equipment	Operates and cleans equipment	Ensures that equipment is cleaned and serviced as required	Ensures that equipment is cleaned and serviced as required and may provide guidance to others
8.2 Undertake glass working	Learns simple techniques to cut and work with glass	Applies simple techniques to cut and work with glass	Applies techniques to cut and work with glass	Applies techniques to cut and work with glass and may provide guidance to others
8.3 Electrical (low voltage), soldering, electronics	Learns how to solder for minor repairs and re-attaching terminals to leads	Makes minor repairs including soldering and manipulating electronic components	Makes minor repairs including soldering and manipulating electronic components	Makes minor repairs including soldering and manipulating electronic components and offers guidance to others in this
8.4 Other maintenance and repairs as required	Communicates with line manager to facilitate repairs required	Communicates with line manager and may liaise with repair services	Liaises with repair services directly	Liaises with repair services directly and guides other staff in determining the scope of repairs required

Note: Employers should provide opportunities for technicians to have access to Professional Learning in laboratory techniques

9. Contribute to the administrative management of the school science department

Descriptor	Trainee Science Technician	Science Technician	Senior Science Technician	Science Laboratory Manager
9.1 Stock Control of materials and equipment	Assists with stocktaking and record keeping procedures	Assists with stocktaking and record keeping procedures	Undertakes stocktaking and record keeping procedures and may recommend new equipment to be purchased	Gives guidance in the establishing and maintaining inventories and the purchase of new or alternative equipment
9.2 Purchasing procedures for the site	May assist in ordering consumables and new equipment	Follows correct procedures for ordering consumables and new equipment	Uses correct procedures when ordering consumables and new equipment	Uses correct procedures and may train others in ordering consumables and new equipment
9.3 Management of budgets	May assist in the processes used for petty cash expenditure	May assist in the processes used for petty cash expenditure and/or receipting money coming into the faculty	Uses the school's systems to account for money coming in, outgoings and petty cash expenditure	Manages budgets and may develop submissions for future acquisitions or special funding.
9.4 Personnel management	Develops and maintains professional working relationships with other school personnel	Develops and maintains professional working relationships with other school personnel	Develops and maintains professional working relationships with other school personnel.	Liaises effectively with school personnel and may assist in the processes used in advertising for, interviewing and selecting new staff
9.5 Timetabling	May assist in locating staff and/or classes using timetables	May assist in locating staff and/or classes using timetables	Locates staff and/or classes and may recommend changes to facilitate sharing of resources	Locates staff and/or classes, may recommend changes to facilitate sharing of resources
9.6 Chemical management systems	Undertakes training in chemical management systems	Accesses chemical management system databases	Accesses and maintains the documentation of chemical management systems	Supports the compliance of chemical management systems
9.7 Licensing Requirements	Assist in the documentation required for licensing requirements	Assist in the documentation required for licensing requirements	Assist in the documentation required for licensing requirements	Identify appropriate licensing requirements and support compliance with licencing requirements

Note: Employers should provide opportunities for technicians to have access to Professional Learning in administration systems

DOMAIN 3: PROFESSIONAL ATTRIBUTES

10. Demonstrate effective communication and interpersonal skills

Descriptor	Trainee Science Technician	Science Technician	Senior Science Technician	Science Laboratory Manager
10.1 Shows effective oral and written communication skills with competency in the English language [1]	Understands and responds to Occupational Health and Safety risks and practices in the workplace Follows oral and written instructions and exchanges relevant information	Understands and responds to Occupational Health and Safety risks and practices in the workplace Communicates effectively and is able to exchange relevant and scientific information	Understands and responds to Occupational Health and Safety risks and practices in the workplace Communicates effectively and is able to exchange and explain relevant and scientific information and give feedback	Understands and responds to Occupational Health and Safety risks and practices in the workplace Communicates effectively and is able to exchange, explain and present relevant and scientific information and give detailed feedback
10.2 Shows effective professional interpersonal skills	Demonstrates good interpersonal skills and is able to relate to teaching staff	Effectively liaises with teaching staff and other school based and external personnel	Effectively liaises with teaching staff and other school based and external personnel Has effective negotiation skills	Effectively liaises with teaching staff and other school based and external personnel Has effective negotiation and leadership skills
10.3 Shows effective skills when communicating with students	Develops good communication skills appropriate for use when working with students Works alongside the teacher in the laboratory and on excursions Learns about their own personal legal responsibilities when working with students	Develops good communication skills appropriate for use when working with students Works alongside the teacher in the laboratory and on excursions Understands their own personal legal responsibilities when working with students	Demonstrates good communication skills and appropriate strategies when communicating with students. Works directly with students in the laboratory and on excursions Understands their own personal legal responsibilities when working with students.	Demonstrates good communication skills and appropriate strategies when communicating with students and may guide others who are learning to do so Works directly with students in the laboratory and on excursions Understands their own personal legal responsibilities when working with students and may inform others of them

[1] There is a requirement in Australia for SDSs and Chemical Labels to be written in plain English. Therefore competency in the English language is required to access health and safety information.

10.4 Shows effective use of communication technologies	Undertakes training in the use of communication technology, such as, but not limited to, telephones, faxes and computer programs including emails and word processing documents	Develops skills in the use of communication technology, such as, but not limited to, telephones, faxes and computer programs including emails, word processing documents, spread sheet applications and Internet searches	Demonstrates skills in the use of communication technology, such as, but not limited to, telephones, faxes and computer programs including emails, word processing documents spread sheet applications and Internet searches	Demonstrates skills and may train others in the use of communication technology, such as, but not limited to, telephones, faxes and computer programs such emails, word processing documents spread sheet applications and Internet searches May be able to use new technologies, such as smart-boards in presentations

Note: Laboratory technicians and managers often work with students in school laboratories and on excursions. It is important that they have an understanding of how to relate effectively to students and also of their legal responsibility when doing so, especially with regard to dealing with unsafe practices and inappropriate behaviour by students towards other students, staff or facilities.

Technicians and managers would benefit greatly from early formal training designed to develop communication strategies appropriate for use with the age groups that they work with.

Note: Employers should provide opportunities for technicians to have access to Professional Learning in communication skills

11. Engage in relevant ongoing professional learning and reflection

Descriptor	Trainee Science Technician	Science Technician	Senior Science Technician	Science Laboratory Manager
11.1 Participates in relevant professional learning	Attends professional learning delivered by others	Attends professional learning delivered by others	Attends professional learning delivered by others May undertake relevant professional research and reading	Attends professional learning delivered by others Undertakes relevant professional research and reading
11.2 Reflects on their professional knowledge and practice to seek constant improvement	Participates in discussions with and applies feedback from their line manager regarding professional learning and development opportunities	Participates in discussions with and applies feedback from their line manager regarding professional learning and development opportunities	Participates in discussions with and applies feedback from their line manager regarding professional learning and development opportunities Reflects and collaborates with colleagues to identify areas for improvement	Participates in discussions with and applies feedback from their line manager regarding professional learning and development opportunities Reflects and collaborates with colleagues to identify areas for improvement and suggests suitable professional development opportunities to meet these needs
11.3 Plans and delivers professional learning for others	Not Applicable	Not Applicable	May plan and deliver professional learning for laboratory personnel	May plan and deliver professional learning for laboratory personnel and teaching staff

Note: Employers should provide opportunities for technicians to have access to Professional Learning

12. Work collegially within their school community and wider professional communities

Descriptor	Trainee Science Technician	Science Technician	Senior Science Technician	Science Laboratory Manager
12.1 Actively contributes to the science faculty	May attend science faculty meetings and contribute to relevant discussion	May attend science faculty meetings and contribute to discussion when appropriate	Attends science faculty meetings and may initiate discussion on laboratory matters	Attends science faculty meetings and ensures that laboratory issues are raised and discussed.
12.2 Actively contributes to the school community	Attends staff meetings when invited and may participate in relevant discussion	Attends staff meetings when invited and may participate in relevant discussion	Attends staff meetings when appropriate and may participate in relevant discussion May participate in other areas of the school, such as WHS, and school events (e.g. Open Days)	Attends staff meetings when appropriate and may participate in relevant discussion May contribute in other areas of the school, such as WHS and school events (e.g. Open Days)
12.3 Networks with school science technicians from other sites	Aware of and may participate in school science networks and may join relevant professional association(s)	Participates in school science networks and may join relevant professional association(s)	Participates in and may develop networks with school science technicians and joins relevant professional association(s)	Participates in and may develop networks with school science technicians, joins relevant professional association(s) and encourages others to do likewise
12.4 Contributes to science facilities development	May participate in the development of science facilities	May participate in the development of science facilities	Participates in the development of science facilities	Develops plans, in conjunction with other senior staff members for the development of science facilities

Note: Employers should provide opportunities for technicians to have access to professional networking occasions

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Appendix 1

List of some relevant legislative regulators:

Where there are differences between jurisdictions please refer to your state/territory legislation

Work Health and Safety Laws with links to legislation by jurisdiction

- National Policy Development — Safe Work Australia
  - Commonwealth jurisdiction http://www.comcare.gov.au/
  - Australian Capital Territory http://www.worksafe.act.gov.au/
  - New South Wales http://www.workcover.nsw.gov.au/
  - Northern Territory http://www.worksafe.nt.gov.au/
  - Queensland http://www.worksafe.qld.gov.au/
  - South Australia http://www.safework.sa.gov.au/
  - Tasmania http://www.wst.tas.gov.au/
  - Victoria http://www.worksafe.vic.gov.au/
  - Western Australia http://www.worksafe.wa.gov.au/

- Animal Ethics with links to legislation by jurisdiction
  - http://www.nhmrc.gov.au/guidelines/publications/ea16
    - Australian Capital Territory
      http://www.det.act.gov.au/__data/assets/pdf_file/0007/191815/DET_Care_Use_Of_Animals_2010.pdf
    - New South Wales
      http://www.animalethics.org.au/
    - Northern Territory
      http://www.animalwelfare.nt.gov.au/
    - Queensland
      http://education.qld.gov.au/curriculum/area/science/animal-ethics.html
    - South Australia
      http://www.decd.sa.gov.au/animalethics/pages/cg0001037/16295/?reFlag=1
      http://www.ais.sa.edu.au/home/general-information/animal-ethics
    - Tasmania
      http://www.dpiw.tas.gov.au/inter.nsf/WebPages/CPAS-5JH6QT?open#1animalethics
    - Victoria
      http://www.education.vic.gov.au/management/schooloperations/animalcare/default.htm
    - Western Australia
      http://www.det.wa.edu.au/curriculumsupport/animalethics/detcms/portal/

- Native Animal legislation
  - Environment Protection and Biodiversity Conservation Act 1999. This legislation sets out the national framework for Environmental Protection

For more detailed information search the term “legislation” on the Science ASSIST website: http://assist.asta.edu.au/

Appendix 2

Elaborations

1. Understand relevant scientific concepts

Scientific knowledge may include but is not limited to concepts of:

Physical Sciences	Chemical Sciences	Biological Sciences	Earth, Environment and Space Sciences
• forces and laws of motion • gravity • magnetism, electricity and electronics • light, sound and radio waves • energy transformation and conservation, heat • lasers and radiation • nuclear energy as they apply to the relevant science courses	• states of matter • elements, compounds and mixtures, separation of mixtures • the structure of atoms and molecules • chemical reactions, titrations, energy transfer, rates of reactions • Periodic Table • electrochemistry • organic chemistry • analytical techniques as they apply to the relevant science courses	• classification of plants and animals • structure, function and behaviour of cells, organs and organisms • reproduction and genetics • the theory of evolution and natural selection • body systems and homeostasis • food webs, ecosystems and biodiversity, matter and energy flow as they apply to the relevant science courses	• sedimentary, igneous and metamorphic rocks and processes • Minerals, properties and formation • plate tectonics • earth systems and processes and their changes over geological time. • geological time scale, fossils and evolution • ecosystems, their changes over time, and their sustainability • renewable and non renewable resources • global environmental conditions and human impact • water and the water cycle • carbon cycle • the solar system, seasons and eclipses • the big bang theory as they apply to the relevant science courses

2. Possess technical knowledge

Technical knowledge may include but is not limited to concepts of:

Physical Sciences	Chemical Sciences	Biological Sciences	Earth, Space and Environmental Sciences	ICT & AV as applied to science programs
• how to set up and use general and specialist physics equipment • how to use a digital multi-meter, ammeter and voltmeter • how to read circuit diagrams and recognise and understand circuit components including resistors, capacitors, transistors, diodes • basic electronics and how to solder • how to correctly store and safely handle radioactive sources and take measurements using a Geiger counter. • how to use data logging equipment and video analysis to measure velocity, acceleration, time of flight, light and sound waves and forces.	• how to plan, implement and monitor environmentally sustainable work practices • the calculations needed and how to prepare and standardise solutions • a range of chemical testing procedures • how to set up and use chemistry equipment in the laboratory	• safe work practices including the use of tissues and cell cultures • how to prepare and the applications of a range of culture media for different uses • aseptic techniques • how to prepare and stain specimens for microscopic examinations • how to use, maintain and recommend purchase of monocular and binocular microscopes appropriate to schools • where to procure specimens from approved sources to be used for dissections • how to dissect a variety of biological specimens • how to set up and use biology equipment in the laboratory and the field • knows a range of sampling techniques for use in the field conservation principles and practices applicable to fieldwork	• the physical and chemical features and understands basic classification of minerals and rocks • how to design and make models to demonstrate geological and other scientific concepts	• how instruments operate and how to clean them • how to calibrate a wide variety of equipment • how to work with glass in various forms • how to repair a variety of equipment • how to operate computer software appropriate to the laboratory and field • how to operate and identify problems with AV equipment used in the laboratory

3. Familiar with legislative requirements

Legislative knowledge may include but is not limited to:

Workplace Health and Safety	Risk Assessment and Hazard Management Requirements for the Science Area	Physics Safety in Science	Chemical Safety in Science	Biological Safety in Science	Licensing Requirements
• WHS Act, • WHS Regulations • Relevant Codes of Practice • Relevant Australian Standards.	• hazard identification • risk assessment procedures • hazard control measures • laboratory safety audits	• Electrical Safety Testing requirements • Use of lasers • Radiation safety compliance	• Relevant documents e.g. Safety Data Sheets (SDS) • safe handling • labelling • storage • disposal procedures	• biological procedures appropriate to school facilities • procurement of biological materials • approved handling and disposal procedures	• animal ethics: use and care of animals in science • flora and fauna licences • radiation • chemical purchases

Where there are differences between jurisdictions please refer to your state/territory legislation

4. Possess administrative knowledge

Administrative knowledge may include but is not limited to:

Stock Control and purchasing procedures	Budgets	Personnel	Timetabling	Chemical management systems
• establishing and maintaining an inventory • stocktaking and record keeping • determining the consumables and equipment needed on site • correct procedures for ordering consumables and new equipment	• schools systems to account for: money coming into the faculty, outgoings and petty cash • developing and managing a budget • recommending purchases and developing submissions for future or special funding	• establishing and maintaining professional working relationships with other school personnel • how to manage personnel and may assist in the processes used in advertising for, interviewing and selecting new staff	• the operation of science faculty timetables • able to suggest changes for best use of facilities in response to changing circumstances	How to access, understand and maintain • A chemical register • SDS's • Risk assessments

5. Deliver practical aspects of the science curriculum

Delivery of practical aspects of the science curriculum may include but is not limited to:

Preparation of materials and equipment for practical activities
• Perishable and non-perishable consumables • Digital and analogue measuring tools • Biological specimens of plants and animals and samples for dissections • Microbiological media • Microscopy specimens and tools • Glassware • Chemicals, stains and indicators • Geological specimens and tools • Specialist physics equipment • Radiation sources and equipment

7. Practice sound laboratory techniques

Sound laboratory techniques may include but are not limited to:

Physical Sciences	Chemical Sciences	Biological Sciences	Earth, Space and Environmental Sciences	ICT & AV as applied to science programs
• setting up and using physics equipment • using circuit diagrams, electronic components, and soldering • safely handling radioactive sources and using a Geiger counter. • setting up and using data logging equipment and video analysis to measure velocity, acceleration, time of flight, light and sound waves and forces. • may recommend alternative activities and/or equipment	• planning and implementing environmentally sustainable work practices • preparing, standardising, using and monitoring quality of solutions • undertaking a range of chemical testing procedures and analysis • using and setting up chemistry equipment • may recommend alternative chemicals, activities and/or equipment	• safe work practices in the laboratory and the field • preparing, cultivating and handling tissues, cell cultures and media • aseptic techniques • preparing and staining specimens when using monocular and binocular microscopes • preparing dissection specimens • conservation practices during fieldwork • may recommend alternative activities and/or equipment	• identifying the physical and chemical features of igneous, metamorphic and sedimentary rocks • designing and making models to demonstrate geological features and other scientific concepts	• operating and cleaning equipment • calibrating a wide variety of equipment • working with glass in various forms • using computer software appropriate to the laboratory and field • using data loggers and associated probeware • operating and identifying problems with AV equipment used in the laboratory • techniques in new and emerging technologies

Appendix 3

LEVELS OF SERVICE

Association of Science Education service standards (Royal Society & ASE, 2001)

Service factor	Description of service standard
0.85	This is the recommended allocation of technician support to science teaching for a compact suite of laboratories with adjoining preparation and storage space. All functions are feasible including the accessing of training and developing opportunities to meet the schools changing needs.
0.70	At this level of allocation provision of the full range of functions will depend upon recruiting well-qualified and experienced technicians. Where the full range is possible there will be a need to prioritise functions and decide on the emphasis of support required. It may still be possible to achieve a balance between resource related, design and development and direct support activities.
0.60	It will not be possible to deliver all functions adequately and a restricted range of priorities will need to be identified. Efficient management of resources and administration are likely to be affected and activities related to design and development of practical programmes and direct support will be in jeopardy. Functions possible may well depend on the skills and experience available and a policy for training will be essential to maintain the service.
0.45	Functions will be markedly reduced and in most cases no more than simple, immediate maintenance and control will be possible. In the long-term efficiency in these will be impaired. The availability and range of resources will become restricted and the development of effective practical programmes may be impaired. A supervisory structure for the less experienced may have to be provided from

	elsewhere. Regular training will be essential but difficult to accommodate.

Appendix 4

History of changes

Date	Version Number	Notes
April 2013	Version 1.0	
August 2014	Version 1.1	**Service factor** inclusion of: "This is regardless of the number of students at the school." **Appendix 1** inclusion of a link to the commonwealth regulator and also to Science ASSIST **Appendix 2** inclusion of additional items for physical sciences: *2. Possess technical knowledge* *7. Practice sound laboratory techniques* **Appendix 4** History of changes