SIAS

Apprenticeship standard

Technician Scientist

ST0597

Work Based Learning Guide

December 2017

SIP

Purpose of document

This work based learning guide contains the detailed specification of the level of skills, knowledge and behaviours required to achieve occupational competence in the development phase of the Technician Scientist Apprenticeship.

The work based learning guide has been developed by employers and will be maintained to reflect any future changes that are needed to maintain world class levels of quality and ensure that the credibility and consistency of the apprenticeship outcome is maintained. The apprenticeship outcome is described in Apprenticeship standard Technician Scientist.

The mandatory assessment process that leads to the Apprenticeship award is available from info@siasuk.com.

	CORE COMPETENCES
Std Ref	Competences that need to be achieved by anyone being trained for the occupation. All elements within the core competencies are mandatory.
CORE REQUIREMENTS: KNOWLEDGE	
S1 **S2**	**The principles of non-complex laboratory techniques and scientific experimentation and how to contribute to the development of technical projects and implement new processes according to the literature.** **A theoretical knowledge of chemistry or life sciences plus specialised science and technology relevant to the job role.**
1	On completion, apprentices will hold a Higher National Diploma or Foundation Degree qualification recognised by the Science Council at Level 5 in a discipline relevant to their job role. Details of suitable qualifications can be obtained from the Science Council (http://www.sciencecouncil.org/Rsci)
S3	**The requirements and significance of reporting results, considering the importance of accuracy, precision and recognising trends.**
S4	**How to use mathematical concepts and techniques: units, dimensions, exponentials logarithms and elementary probability and basic statistical analysis relating to sampling and data to evaluate results.**
S5	**The basic principles and procedures of project management: project plan, project timeline & milestones, risk log, outcome reviews, product definitions and product owners, key performance measures, action logs, project documentation, project budgets and how to contribute to project plans with other team members.**
S6	**How to comply with business rules pertaining to record keeping, traceability & confidentiality and quality systems.**
2	Demonstrate an understanding of the relevant good laboratory documentation practices including keeping accurate records of laboratory work undertaken, analysis of results and conclusions drawn
S7	**The internal and external regulatory environment pertinent to the science sector and how to comply with regulations.**
3	Understand the internal regulations pertinent to the sponsoring company & relative specialism in which they operate (e.g. Good Laboratory Practice, Good Manufacturing Practice, Good Documentation Practice, Good Clinical Practice, ISO17025)
4	Understand the external regulatory requirements pertinent to the sponsoring company, relative specialism and region in which they operate (e.g. COMAH, MHRA, FDA, ONR, Animal Scientific Procedures Act 1986 and Directive 2010/63/EU (ETS123 Guidelines))
S8	**The business environment in which the company operates including personal role within the organisation, ethical practice and codes of conduct.**
5	Understand the wider business environment (customers, competitors etc.) in which the organisation operates and how the roles of different departments or functions interact to deliver overall business objectives

6	Understand own role within the organisation and how it impacts/influences the business; demonstrate understanding and compliance with relevant codes of conduct and ethical practice (e.g. GLP, environmental considerations, professional body code of conduct, company code of conduct)
CORE REQUIRMENTS: SKILLS	
S9	**Perform laboratory based investigations and basic scientific experimentation using the appropriate scientific techniques, procedures and methods of relevance to the activities of the laboratory.**
7	Understand and apply a variety of documents such as Standard Operating Procedures and Test Methods in line with company policy
8	Prepare for, and perform, laboratory experiments, tests or tasks following specified methodologies to provide reliable, accurate data for example • Spectroscopic/optical techniques • Cell-based immunoassays • Solution chemistry • Electrochemical/thermal/separation techniques • Analytical methods/Chromatography • Biochemical techniques • Computer modelling/digital design technologies • Radiochemical & Radiometric Techniques
9	Demonstrate technical competence in the use of specified instruments and equipment, where appropriate developing subject matter expertise with a suitable technology
10	Understand and demonstrate appropriate sampling procedures and relevant sampling techniques
11	Demonstrate theoretical and practical understanding of maintenance procedures, report faults and seek diagnostic advice to maintain equipment and facilities in good working order, including calibration where required
12	Use good laboratory documentation practices keeping accurate records of laboratory work undertaken, analysis of results and conclusions drawn
13	Contribute to the preparation of scientific and technical reports to a level commensurate with the expectations of the job role
14	Understand the principles behind valid analytical measurements, method performance characteristics, uncertainties in analytical results and method verification/validation
S10	**Comply with the quality standards, safe working practices, environment and risk management systems relevant to the workplace.**
10a	**General workplace Health and Safety**
15	Demonstrate and comply with foundations of health and safety including responsibility for workplace safety under 'Health & Safety at Work Act'
16	Understand the procedures for first aid relevant to your workplace
17	Demonstrate and comply with risk assessment & control measures including 'Control of Substances Hazardous to Health' risk assessments, Material Hazards and Safety Data Sheets including potent materials and controlled substances, where appropriate

18	Demonstrate appropriate use of personal protective equipment e.g. face mask, fume hoods
19	Understand and practise fire and electrical safety procedures in the workplace
20	Understand and practise safe manual handling and repetitive activities, including correct use of Display Screen Equipment
21	Demonstrate and comply with site and local emergency procedures, relevant organisation safety policies and procedures
10b	**Laboratory Safety & Housekeeping**
22	Work safely in a laboratory and maintain excellent housekeeping, in accordance with organisation operating procedures
23	Identify potential safety hazards and recommend solutions to improve safety standards, report incidents and near misses
24	Order and control stocks of laboratory materials and equipment where required
25	Perform internal auditing in support of local health and safety policies, raise and allocate corrective actions and close designated tasks to time
26	Understand, follow and write local risk assessments for work carried out within own laboratory space
27	Demonstrate and comply with laboratory health and safety and compliance with legal, regulatory, ethical requirements
10c	**Environmental Management**
28	Understand and apply procedures for the management and control of laboratory waste, handling and disposal of chemical and biological substances
29	Understand environmental risk assessments (impact assessment)
30	Understand and apply the concepts of resource efficiency to energy, water and waste
10d	**Workplace quality standards**
31	Understand, follow and promote company quality procedures to meet the requirements of quality standards relevant to the workplace
32	Recognise when something has not been carried out correctly within the laboratory environment, promote behaviour amongst colleagues and explain the impact this could have
33	Perform internal auditing in support of local quality policies, raise and allocate corrective actions and close designated tasks to time
34	Complete documentation proficiently including relevant calculations including understanding error reporting and correction techniques
35	Competent in laboratory investigations, including reporting out of specification results, and be able to recommend applicable corrective and preventative actions to address the investigation
36	Understand the benefits and requirements of accreditation of an analytical service provision e.g. ISO 17025, both for routine (proven and accredited) methods and for methods under development, where applicable.
S11	**Explain the main concepts of the scientific principles according to the literature applicable to the laboratory based techniques and scientific experimentation used in the laboratory**

37	Understand the theoretical basis for laboratory based techniques used in the laboratory
38	Using advanced laboratory techniques relevant to job role be able to describe the theory, application and challenge assumptions
S12	**Contribute to the development of new processes and methodologies and support their implementation as part of a wider team.**
39	Participate in improving systems and processes within your work environment
S13	**Work with minimal supervision to produce and analyse scientific data and present the results of laboratory work and problem solving clearly and concisely in written and oral form.**
40	Practical demonstration of one or more problem solving techniques
41	Demonstrate the use of advanced statistical analysis techniques for evaluation of results and data presentation to a technical audience
42	Demonstrate identification of sources of error and how they can be reduced e.g. human error
43	Demonstrate the use of standard and non-standard software packages and applications
44	Understand and demonstrate the application of the principles of Laboratory Information Management systems digital or paper based
45	Understand and apply basic root cause analysis
46	Challenge routine practices and address non-routine problems with appropriate sampling and instrumentation, within defined areas
47	Identify and critically evaluate relevant scientific information from appropriate technical resources e.g. databases, scientific literature, and challenge assumptions in order to contribute to novel solutions
S14	**Use computer based data analysis tools including spreadsheets and relevant company software packages.**
S15	**Plan and prioritise own tasks, review and evaluate progress against objectives and project plans as part of a wider project team.**
48	Competent in project management tools and techniques, including software packages pertinent to the role and techniques used within the industry
49	Demonstrate practical application of project management life cycle approaches including, but not limited to, project identification, conducting scientific research to analyse options, experimental design, interpretation of results, drawing conclusion and recommendations that achieve the project aim
50	Break down departmental goals or organisational objectives in to a manageable personal action plan aligned with the business vision
51	Identify important personal and workgroup results that need to be achieved on a week-by-week basis
52	Continuously monitor personal progress against objectives, revisit plans and suggest alternative tasks to achieve objectives
S16	**Contribute to recommendations on the appropriate workflows, improvements or scientific solutions to meet the requirements of internal or external customers.**
53	Understand how workplace organisation techniques can be applied to improve workflow of the laboratory
54	Identify customer's underlying needs (internal/external) and determine whether these needs can be addressed by a scientific approach

55	Identify operational constraints which could affect the scientific approach to meeting a customer's requirements
56	Identify and develop hypothesis from relevant scientific information to address customer needs and agree appropriate performance criteria with the customer
57	Demonstrate professional interaction with customers, using solicited feedback for self-directed learning and personal improvement
S17	**Find solutions to routine and non-routine problems and contribute to developing solutions to complex problems using techniques such as root cause analysis.**
58	Propose new or unusual approaches to existing problems, testing the hypothesis with critical evaluation of the results
59	Challenge underlying assumptions and established ways of working
60	Identify and use scientific approaches required to solve problems, support new investigations and follow-up experiments in the laboratory for routine and non-routine tasks
S18	**Contribute to continuous performance improvement within the scientific and technical environment.**
61	Active member of a continuous improvement project that delivers recognised efficiencies within own workspace
62	Demonstrate one or more continuous improvement techniques e.g. • Workplace organisation techniques • Management strategies such as 'Lean' or 'Six Sigma' • Accreditation (e.g. ISO, UKAS), external audits • Reduction of waste • Internal auditing process
63	Demonstrate where you have personally improved and become more efficient
S19	**Communicates effectively using a full range of skills: speaking to a scientific and non-scientific audience, active listening, professional writing, and scientific presentation.**
64	Readily comprehends oral and/or written instructions when first presented and able to present scientific/technical information to a range of audiences
65	Passes on information both verbal and written, in a way that is easily understood to a wider technical team
66	Listens and will question and challenge appropriately to enhance own understanding
67	Able to effectively present personal viewpoint and influence others within the team
68	Receptive to other people's point of view
69	Take part in technical presentations to a scientific audience both within the workplace and external to the area of expertise
70	Participate in community or academic projects to promote science to a non-technical audience (internal/external)

71	Present technical poster, abstract and formal written scientific poster to an appropriate audience (internal/external)
S20	**Works with minimal supervision and interacts effectively within a wide, scientific team.**
72	Make useful contribution during wider team discussions and initiates problem solving
73	Demonstrates knowledge and understanding of team/organisation mission and how this fits into the sector
74	Works cooperatively with others to achieve overall team goals and understands how these influence the wider organisation
75	Can be trusted to complete tasks and Identifies obstacles to achieving work assigned and escalates
76	Can be relied on to manage their work with little supervision
77	Self-motivated and deals with work/learning balance in a positive way
S21	**Manages time effectively, being able to plan and complete work to schedule with thoroughness and attention to detail.**
78	Continually demonstrates efficient use of work time, managing personal time considerately
79	Timekeeping and absence from work complies with company protocols
80	Always prepares in advance, ready to participate in group activities
CORE REQUIRMENTS: BEHAVIOURS	
S22	**Demonstrate reliability, integrity and respect for confidentiality on work related and personal matters, including appropriate use of social media and information systems**
81	Understand confidentiality policies within the work place and know how to apply them
82	Appropriate use of social and business media within the workplace and understand application of company policies
83	Adhere to company Information Technology policies including appropriate use of e-mail and professional electronic communication
84	Adhere to document security classification and understand the control requirements for technical/scientific publications, e.g. internal and external reports and presentations
S23	**Takes account of the impact of work on others, especially where related to diversity and equality.**
85	Works to the required standard of accuracy, neatness and thoroughness. Often makes valued contributions to team quality.
86	Respects and encourages the value of others.
87	Usually tactful, considerate and respectful in dealing with others.
88	Understands and adheres to the regulations relating to equality
S24	**Handles and responds positively to change, adjusting to different conditions, technologies, situations and environments.**
89	Understand the principles of change management and how they apply to the direct place of work

90	Flexible, willing and able to respond to changes in work situations and/or learn new skills
91	Works hard to implement successful change in areas of responsibility as directed by supervisor
92	Able to demonstrate examples of situations when they have changed practice or personal behaviour
S25	**Takes responsibility for personal development with ability to observe and communicate observations on own learning.**
93	Recognise areas for self-development and demonstrate personal awareness of strengths and weaknesses
94	Demonstrate self-directed learning to continually develop technical and transferable skills