Technician Scientist V1.0

Level 5 Apprenticeship Standard (ST0597)

Specification

This guide describes the different types of End-Point Assessment tests, the test rules and who should be involved. Preparing for End-Point Assessment and working with SIAS are also covered.

SIAS is the science industry assessment service. It is part of the Cogent Skills Group. For further information about apprenticeship standards and Trailblazers please contact info@siasuk.com.

Version History

Version	Updates
1.0	This document relates to the Technician Scientist assessment plan version 1.0.
1.1	Update to formatting and correction of typos.

Contents

Objective

The aim of this End-Point Assessment (EPA) is to ensure that the apprentice is occupationally competent against the knowledge, skills and behaviours outlined in the assessment plan for this standard.

A technician scientist carries out established laboratory-based investigations and basic scientific experimentation using bench and instrumentation techniques. They use a range of routine skills and some advanced and specialised skills following well established principles associated with their organisation's science and technology, which may typically be within chemical, pharmaceutical, biotechnology, formulated products or analytical services.

They carry out routine lines of enquiry, development or investigation taking responsibility for the quality of the work they undertake. They work safely and ethically often under highly regulated conditions because of the need to control quality and safety of scientific products. They critically evaluate appropriateness of commonly used approaches to solving routine problems, using a range of approaches to formulate evidence-based responses to defined and routine problems and issues within their area of work. They also contribute to solutions to problems within the wider scientific team, using appropriate project management procedures. They perform record keeping and checks and use data capture systems relevant to the technical and scientific procedures that they use. They analyse relevant scientific information, interpret and evaluate data, prepare results and provide progress updates of their work. They manage resources within a clearly defined area.

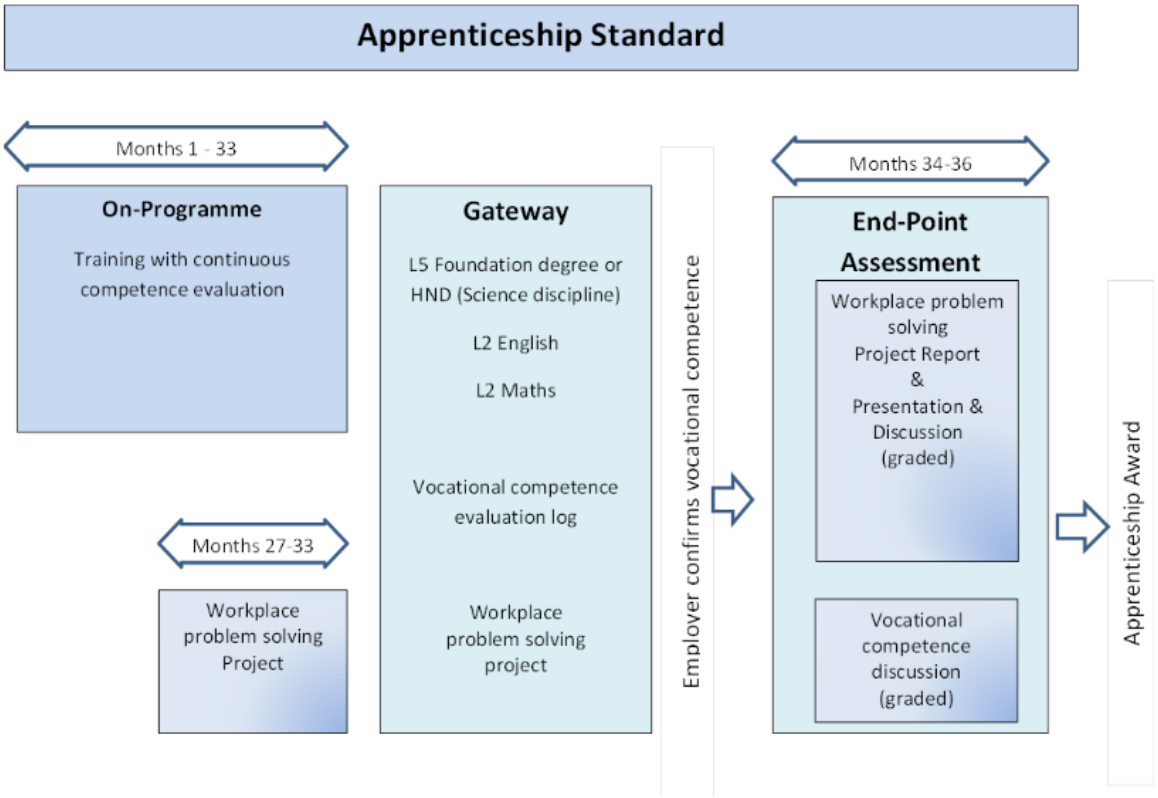
They use their awareness of any research interests and the technical context and processes of the laboratory alongside senior team members to contribute to the proposal of new scientific ideas. They have an up-to-date knowledge of technical, scientific and regulatory developments related to the conduct of the laboratory. They communicate information, arguments and analysis in a variety of forms to specialist and non-specialist audiences.

They work as part of a wider scientific team, which may include laboratory scientists and laboratory technicians, in settings where there is certainty and with limited ambiguity taking personal responsibility for decision making in routine predictable contexts.

Prior Learning and Qualifications

Typically, candidates will have grade C or above in at least five GCSE's, including English, maths and a science subject and hold relevant level 3 qualifications providing the appropriate number of UCAS points for entry to a level 5 HE programme. Other relevant or prior experience may also be considered as an alternative.

Overview



A full time Technician Scientist will typically require 33 months on-programme.

The EPA should be completed within an EPA period lasting typically 3 months.

The apprentice must complete their training and meet the gateway requirements before starting their EPA. The EPA will assess occupational competence.

This EPA has 2 assessment methods. The grades available for each assessment method are below.

Assessment Method 1 – Workplace Problem Solving Project Report and Presentation with Questioning.

- Fail
- Pass
- Distinction

Assessment Method 2 – Vocational Competence Discussion

- Fail
- Pass
- Distinction

Performance in the EPA will determine the overall apprenticeship grade.

- Fail
- Pass

- Distinction

The apprentice must pass all EPA methods to successfully complete the apprenticeship.

Competence Evaluation

During the apprenticeship, regular evaluation of the competence of the apprentice against the apprenticeship standard will help to ensure that they achieve full occupational competence by the end of their training, and they are ready for EPA. Confirmation from the employer that the apprentice is fully competent is needed before EPA can take place.

As competence evaluation is an in-programme activity, the process that is used for this has not been mandated. It is for the employer supported by their training provider to decide how they wish to do this. To help with this SIAS has produced the SIAS Competence Tracker.

Gateway Requirements

Apprentices must complete the gateway requirements and provide evidence to SIAS as detailed below before taking the EPA. On completion of the gateway requirements, the employer must confirm the apprentice as ready for the EPA.

Apprentices must complete the gateway requirements detailed below before taking the EPA.

- L5 Foundation Degree (FdSc) or Higher National Diploma (HND) in a science or technology discipline relevant to the role. For example:
    - FdSc Chemical Science
    - FdSc Applied Bioscience
    - HND Applied Chemistry
    - HND Applied Biology
- Workplace Problem Solving Project Plan
- Vocational competence evaluation log
- English and maths at Level 2

Assessment Methods

The EPA has two assessment methods.

1. Workplace problem solving Project Report and Presentation with Questioning
2. Vocational competence discussion

Workplace Problem Solving Project Report and Presentation with Questioning

As part of EPA the apprentice must produce a report on the workplace problem solving project and conduct a presentation of the report to an EPA panel followed by questioning. Where the apprentice was contributing to the project work of a wider team the report must focus on the apprentice's contribution, which will then be tested in the EPA through the presentation with questioning. The employer must confirm the project report is the apprentice's own work.

The project report must cover, but need not be limited to:

1. Problem definition and data analysis

    a. Analysis of the problem using techniques such as root cause analysis.
    b. Analysis of scientific information, workflow data and other relevant laboratory data pertinent to project.
2. Problem solving method
    a. laboratory techniques or/and scientific method selected.
    b. analysis of data produced from application of the selected techniques, including the use of any company software packages.
    c. selection criteria and justification for chosen techniques.
3. Problem solution
    a. Presentation of workplace problem solution with supporting data.
    b. Reporting of the results (actual or predicted) of implementation of the workplace problem solution.
    c. Description of resources involved, constraints and risks.
4. Business impact, results and conclusions
    a. Predicted or actual business impact data.
    b. Conclusions drawn including personal reflection on the project scope and definition.

The project report must be submitted to the SIAS two weeks prior to the agreed panel assessment date. It should be a maximum of 3,000 words inclusive of main text, figures, tables and boxes but not including references. It should be submitted as a pdf document. The report will be reviewed by the end-point assessor. The end-point assessor may seek clarification from the technical expert on any of the science, technology or business contexts that are referenced in the report. The end-point assessor will decide if the report meets the above criteria before the presentation to the EPA panel can be undertaken.

Presentation of Workplace Problem Solving Project Report to EPA Panel

The apprentice will be required to present their project report to the assessment panel. The presentation should focus on the practical application of the science that underpins the project and the conclusions of their work. Apprentices are free to select the format for the presentation.

The apprentice may choose to use presentation aides, such as PowerPoint, multimedia and video. The formal presentation will then be followed immediately with a structured discussion.

Each apprentice will be formally interviewed by the assessment panel regarding their project on these themes:

- Their understanding of the principles of laboratory techniques relevant to the project.
- The analysis, interpretation and presentation of their results.
- Their recommendations and how these might benefit the business.
- Their use of personal and professional skills to support delivery of the project plan.

The end-point assessor will select and ask four questions from a bank of standardised competency based questions to ensure a consistent approach is adopted. The end-point

assessor or the technical expert may ask follow up questions to seek clarification where required.

The presentation and structured discussion will be collectively assessed against the knowledge, skills and behaviours as outlined in the assessment plan.

The presentation will typically last 20 -30 minutes and the discussion 45-60 minutes; together they must be no longer than 90 minutes.

Workplace Problem Solving Project Report and Presentation with Questioning Grading Descriptors

KSBs	Assessment element	Fail	Pass	Distinction
S5 S15, S21	Project scope, planning, management & resources, linked to underpinning scientific theory	Lack of clarity on project scope and boundary definition ill defined, little demonstration of effective planning, management and resource allocation. Scope shows limited evidence of links to underpinning scientific theory.	Project scope and boundaries clearly defined to the workplace context of the project. Providing clear project plan and predicted timescales showing consideration of resources. Evidence of systematic evaluation of project progress. Scope shows evidence of links to underpinning scientific theory.	The project scope and boundaries are defined to allow predicted and unforeseen benefits of the solution to be realised. Explanation of management of project risk and mitigating actions. Scope demonstrates high level of understanding of underpinning scientific theory.
S3, S4, S13, S14	Data analysis, use of information technology,	Misinterprets data and uses inappropriate statistical tools to analyse data, results show data inaccuracies and lack of detail.	Data analysis using at least one appropriate statistical tool or analytical technique. Use of calculations pertinent to project such as probability distributions, significance testing & confidence limits. Provides detailed results with few inaccuracies.	Well-structured and systematic data analysis using at least one appropriate advanced statistical tool or technique such as regression & correlation. Precise reporting of detailed results with trends clearly documented.
S1, S9,	Problem solving & selected	Unstructured approach to problem solving	Clear approach to problem solving with evidence of linking	Approach to problem solving uses root cause analysis in

KSBs	Assessment element	Fail	Pass	Distinction
S11, S17	scientific techniques	and no evidence that selected scientific techniques link to desired outcome.	selected scientific techniques to desired outcome.	support of selected scientific techniques that is clearly linked to desired outcome.
S16	Drawing conclusions, impacts on business and application to wider science industry	Inapposite conclusions based on misinterpretation of data, published reference materials and data and lack of consideration of business and wider science industry. Little evidence of links to customer requirements.	Reasoned conclusions based on appropriate data analysis and consideration of business and wider science industry with clear mapping to customer requirements.	Clearly defined conclusions leading to logical recommendations for future projects that reflect a comprehensive understanding of customer requirements. Conclusions drawn including personal reflection on the project scope and definition and future longer term business, wider science industry benefits.
S1, S2	The scientific principles of the laboratory techniques	Difficulty conveying the scientific principles of the laboratory techniques considered and selected.	Clear communication of the scientific principles of the laboratory techniques considered and selected and their relevance to the laboratory activities.	Able to respond to challenge and critiques of the laboratory techniques considered and selected.
S13, S14	Data analysis and interpretation of results	Poor explanation of data analysis and interpretation of results.	Clear explanation of data analysis and interpretation of results.	In depth explanation of data analysis and interpretation of results clearly demonstrates understanding of the links to the scientific principles.
S17	Project Recommendations	Unable to explain recommendations based on conclusions.	Recommendations for immediate next steps for project justified with	Logical recommendations for future new projects or extensions to the

KSBs	Assessment element	Fail	Pass	Distinction
			reference to conclusions.	project scope linked to project conclusions.
S19	Presentation	Unable to effectively present technical project elements and personal viewpoints.	Confident, articulate presentation. Able to respond to technical questioning with ability to respect opinion of others.	Proactively seeks feedback to improve analysis and personal performance.
S20, S25	Use of personal/professional skills	Overall approach to project does not demonstrate use of personal/professional skills and good working practices within the context of the work-based project activity.	Overall approach to project demonstrates use of personal/professional skills and good working practices within the context of the work-based project activity.	Builds working relationships with team members and other group members. Demonstrates creative thinking to resolve obstacles and recommends improvements based on personal experience.

Fail – An apprentice will fail where they do not demonstrate all the pass descriptors.

Workplace Problem Solving Project Report and Presentation with Questioning Knowledge, Skills and Behaviours

Ref	Grading descriptor
Knowledge	
S1	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.
S2	A theoretical knowledge of chemistry or life sciences plus specialised science and technology relevant to the job role.
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.
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.
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
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
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.
S16	Contribute to recommendations on the appropriate workflows, improvements or scientific solutions to meet the requirements of internal or external customers.
S17	Find solutions to routine and non-routine problems and contribute to developing solutions to complex problems using techniques such as root cause analysis.
S19	Communicates effectively using a full range of skills: speaking to a scientific and non-scientific audience, active listening, professional writing, and scientific presentation.
S20	Works with minimal supervision and interacts effectively within a wide, scientific team.
S21	Manages time effectively, being able to plan and complete work to schedule with thoroughness with attention to detail.
Behaviours	
S25	Takes responsibility for personal development with ability to observe and communicate observations on own learning.

Vocational Competence Discussion

Apprentices will take part in a vocational competence discussion with an independent assessor. The purpose is to determine the extent to which the apprentice understands the requirements of his/her role as defined by the standard.

There will be a question bank of eight categories of competence based questions. The categories are:

- Use of the appropriate scientific techniques, procedures and methods of relevance to the activities of the laboratory.
- Reporting results, considering the importance of accuracy, precision and recognising trends.
- Compliance with the quality standards, safe working practices, environment and risk management systems relevant to the workplace.
- Compliance with the internal and external regulatory environment pertinent to the science sector.
- Compliance with business rules pertaining to record keeping, traceability & confidentiality and quality systems.

- Contribution to the development of new processes and methodologies and support of their implementation as part of a wider team.
- Continuous performance improvement & handling change, adjusting to different conditions, technologies, situations and environments.
- Impact of work on others.

The end-point assessor will select one question for each of the categories from the SIAS' question bank. The apprentice must answer each question with examples from their own practice. Examples of these questions are as follows:

- Describe what constitutes the quality management system in which your organisation operates and the role you play within it.
- Describe your role and the tools you use to contribute to reporting of data and how the integrity of data is ensured within the laboratory.
- Describe what 'good practice' is applicable to your organisation in relation to compliance with business rules pertaining to record keeping, traceability & confidentiality and quality systems.
- Explain how you handle change and the steps you need to take to adjust to different conditions, technologies, situations and environments.

The VCD must:

a. be in the format of a 1:1 discussion with the independent assessor; this may be via video-conferencing.
b. comprise 8 questions one from each of the 8 categories listed above.
c. typically last 2 hours up to a maximum of 2 hours and 15 minutes.
d. take place in a room, free from distractions with no other people present except quality assurance personnel where required.
e. be documented and recorded electronically. Where it is not possible to use electronic equipment because of site restrictions this must be agreed in advance with the EPAO and an alternative venue should be used.

The apprentice may bring along their vocational competence evaluation log and evidence referenced in it to refer to during the VCD.

Vocational Competence Discussion Grading Descriptors

KSBs	Assessment element	Fail	Pass	Distinction
S9	Use of the appropriate scientific techniques, procedures and methods	Cannot explain how appropriate relevant scientific techniques, procedures and methods are selected.	Can explain how appropriate relevant scientific techniques, procedures and methods are selected. Supports explanation with example from own practice.	Can explain how selection of appropriate relevant scientific techniques, procedures and methods impacts on the business. Supports explanation with example of

KSBs	Assessment element	Fail	Pass	Distinction
				impact on the business.
S3	Reporting results	Cannot explain the organisation's requirements and the significance of reporting results.	Can explain the organisation's requirements and the significance of reporting results and demonstrates understanding of the importance of accuracy, precision and recognising trends with example from own practice.	Can explain the consequence on the business of not considering the importance of accuracy, precision and recognising trends in own practice.
S10	Compliance with the quality standards	Cannot explain the application of quality standards within own work.	Can explain the impact on own role of applying quality standards in the workplace and linkages to safe working practices and compliance with risk management systems. Supports explanation with example from own practice.	Can explain how the application of quality standards impacts on the wider business. Supports explanation with example of impact on the business.
S7	Compliance with the internal and external regulatory environment	Cannot explain impact of compliance with internal and external regulation on own role.	Can explain impact of compliance with internal and external regulation on own role. Supports explanation with example from own practice.	Can explain how compliance with internal and external regulation impacts on the wider business Supports explanation with example of impact on the business.
S6	Compliance with business rules pertaining to record keeping, traceability & confidentiality	Cannot explain good practice in record keeping and data integrity. Does not demonstrate understanding of rules pertaining	Can explain good practice in record keeping and data integrity. Shows understanding and use of rules pertaining to traceability & confidentiality.	Can explain how good practice in record keeping and data integrity impacts on the wider business Supports explanation with example of impact on the business.

KSBs	Assessment element	Fail	Pass	Distinction
	and quality systems	to traceability & confidentiality.	Supports explanation with example from own practice.	
S12	Development of new processes and methodologies	Cannot provide an example of own contribution to the development of new processes and methodologies	Can provide an example of own contribution to the development of new processes and methodologies Supports explanation with example from own practice	Can explain how own contribution to the development of new processes and methodologies impacted on the business
S18 S24	Continuous performance improvement & handling change	Cannot provide an example of own contribution to continuous performance improvement Unable to explain the steps taken to adjust to different conditions, technologies, situations and environments.	Can provide an example of own contribution to continuous performance improvement and explain the steps taken to adjust to different conditions, technologies, situations and environments. Supports explanation with example from own practice.	Can explain the consequence on the business of not taking the steps needed to adjust to different conditions, technologies, situations and environments.
S22 S23 S8	Impact of work on others	Cannot provide an example of demonstrating reliability, integrity & consideration of the impact of work on others and understanding of business environment, ethical practice and codes of conduct.	Can provide an example of demonstrating reliability, integrity & consideration of the impact of work on others and understanding of business environment, ethical practice and codes of conduct.	Can explain how reliability, integrity & consideration of the impact of work on others and understanding of business environment, ethical practice and codes of conduct impacts on the business.

Vocational Competence Discussion Knowledge, Skills and Behaviours

Ref	Grading descriptor
Knowledge	
S3	The requirements and significance of reporting results, considering the importance of accuracy, precision and recognising trends.
S6	How to comply with business rules pertaining to record keeping, traceability & confidentiality and quality systems.
S7	The internal and external regulatory environment pertinent to the science sector and how to comply with regulations.
S8	The business environment in which the company operates including personal role within the organisation, ethical practice and codes of conduct.
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.
S10	Comply with the quality standards, safe working practices, environment and risk management systems relevant to the workplace.
S12	Contribute to the development of new processes and methodologies and support their implementation as part of a wider team.
S18	Contribute to continuous performance improvement within the scientific and technical environment.
Behaviours	
S22	Demonstrates reliability, integrity and respect for confidentiality on work related and personal matters, including appropriate use of social media and information systems.
S23	Takes account of the impact of work on others, especially where related to diversity and equality.
S24	Handles and responds positively to change, adjusting to different conditions, technologies, situations and environments.

Final Grade

Performance in the EPA will determine the apprenticeship grade – fail, pass or distinction.

A fail will be awarded where the apprentice fails one or more assessment method. A pass will be awarded to individuals that achieve a pass or distinction in both assessment methods. A distinction will be awarded to individuals that achieve a distinction in both assessment methods.

The end-point assessor will combine the results from each assessment method to determine the EPA/apprenticeship grade. Both assessment methods will have equal weighting in determining the final grade. Grades will not be confirmed until after moderation.

Moderation

Assessment organisations will undertake moderation of end-point assessor decisions through observations and examination of documentation on a risk sampling basis. Results cannot be confirmed until moderation has been completed.

Re-takes and re-sits

Apprentices who fail an EPA method(s) will be offered the opportunity to take a resit/retake.

The employer will need to agree that a re-sit/re-take is an appropriate course of action. Any EPA component re-sit/re-take must be taken during the maximum 3-month EPA period; otherwise the entire EPA must be retaken. They are not offered to apprentices wishing to move from pass to distinction.

Re-sits/re-takes will not be awarded a grade higher than pass, unless the EPAO determines there were exceptional circumstances accounting for the fail.

Apprentices should have a supportive action plan to prepare for the re-sit/re-take.

Certification

The outcomes from the End-Point Assessment will be reviewed and a grade conferred by SIAS in accordance with SIAS QA procedures, which are available from SIAS. SIAS will notify the employer of the outcome of each of the assessments.

SIAS will apply for the apprentice's certificate, which will be sent by ESFA. The certificate confirms that the apprentice has passed the End-Point Assessment, has demonstrated full competency across the standard and is job-ready.

Assessment Specification

The assessment specification can be found in the published assessment plan for the standard. Details of which elements of the apprenticeship standard will be tested by each test are given in the Mapping Knowledge, Skills, and Behaviours section of this guide.

Mapping of Knowledge, Skills, and Behaviours

Key:	
Workplace Problem Solving Project Report and Presentation with Questioning	WPR/PD
Vocational Competence Discussion	VCD

Ref	KSB to be assessed	Assessment Method
Knowledge		
S1	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.	WPR/PD
S2	A theoretical knowledge of chemistry or life sciences plus specialised science and technology relevant to the job role.	WPR/PD
S3	The requirements and significance of reporting results, considering the importance of accuracy, precision and recognising trends	WPR/PD VCD
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.	WPR/PD

Ref	KSB to be assessed	Assessment Method
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.	WPR/PD
S6	How to comply with business rules pertaining to record keeping, traceability & confidentiality and quality systems.	VCD
S7	The internal and external regulatory environment pertinent to the science sector and how to comply with regulations.	VCD
S8	The business environment in which the company operates including personal role within the organisation, ethical practice and codes of conduct.	VCD
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.	WPR/PD VCD
S10	Comply with the quality standards, safe working practices, environment and risk management systems relevant to the workplace.	VCD
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.	WPR/PD
S12	Contribute to the development of new processes and methodologies and support their implementation as part of a wider team.	VCD
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	WPR/PD
S14	Use computer based data analysis tools including spreadsheets and relevant company software packages.	WPR/PD
S15	Plan and prioritise own tasks, review and evaluate progress against objectives and project plans as part of a wider project team.	WPR/PD
S16	Contribute to recommendations on the appropriate workflows, improvements or scientific solutions to meet the requirements of internal or external customers.	WPR/PD
S17	Find solutions to routine and non-routine problems and contribute to developing solutions to complex problems using techniques such as root cause analysis.	WPR/PD
S18	Contribute to continuous performance improvement within the scientific and technical environment.	VCD

Ref	KSB to be assessed	Assessment Method
S19	Communicates effectively using a full range of skills: speaking to a scientific and non-scientific audience, active listening, professional writing, and scientific presentation.	WPR/PD
S20	Works with minimal supervision and interacts effectively within a wide, scientific team.	WPR/PD
S21	Manages time effectively, being able to plan and complete work to schedule with thoroughness with attention to detail.	WPR/PD
Behaviours		
S22	Demonstrates reliability, integrity and respect for confidentiality on work related and personal matters, including appropriate use of social media and information systems.	VCD
S23	Takes account of the impact of work on others, especially where related to diversity and equality.	VCD
S24	Handles and responds positively to change, adjusting to different conditions, technologies, situations and environments.	VCD
S25	Takes responsibility for personal development with ability to observe and communicate observations on own learning.	WPR/PD

Further Information

For information about SIAS policies, quality assurance, re-sits, appeals, complaints and general enquiries please see our website: www.siasuk.com

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