

Contents:

Introduction	
Who is the professional framework for?	2
Using the science and engineering professional framework	
Summary of the Science and Engineering Professional Framework	
Science and Engineering Competencies	
Securing, maintaining and developing relevant technical expertise	4
Applying scientific and technical knowledge	
Understanding and complying with statutory requirements and standards	
Sustaining and developing the profession	
Overseeing the technical work of others	
Civil Service Competency Framework – Additional Indicators for Science and Engineering Roles	
Using the professional framework for recruitment and appraisal	



Introduction

This document represents the professional skills framework for the Science and Engineering profession in the Civil Service. It outlines the job-related professional expertise that scientists and engineers may be expected to have at the following levels:

Level 5 and above - Senior Civil Service Pay Bands

Level 4 - Grade 7 and Grade 6 or equivalent

Level 3 - Higher Executive Officer (HEO) and Senior Executive Officer (SEO) or equivalent

Level 2 – Executive Officer (EO) or equivalent

Level 1 – Administrative Assistant (AA) and Administrative Officer (AO) or equivalent

The professional framework should be read in conjunction with the Civil Service Competency Framework (CSCF):

http://resources.civilservice.gov.uk/wp-content/uploads/2012/07/Civil-Service-Competency-Framework-Feb2013.pdf. You should note that there are a number of additional science and engineering specific indicators (page 9-15) listed under the core competency headings, that you may wish to consider.

Who is the professional framework for?

This framework is aimed at staff working in science or engineering posts and their managers. This usually encompasses posts where professional qualifications and experience are directly relevant to the work being undertaken. It also provides a common framework under which staff can describe the skills they have gained in a science and engineering role. It is designed to be a tool to be used alongside the CSCF where it is relevant.

The framework is also relevant to staff who consider science or engineering to be their career 'anchor' and wish to pursue a career in the Civil Service working on science, engineering or technology issues or working closely with scientists and engineers. Those with a science and engineering background at all levels are encouraged to register with Government Science and Engineering to keep abreast of relevant science and engineering activity in other organisations.

Using the science and engineering professional framework...

The framework is a guide for staff, line managers, departmental Heads of Science and Engineering Profession (HoSEPs), Human Resources (HR) sections, and those responsible for science and engineering capability in Civil Service organisations. It is expected that these groups will use the framework and associated descriptors to establish standards and criteria that are applicable in their areas. More detailed guidance on using the framework for recruitment, performance management and development is available on the profession's section of the Civil Service Learning portal.

Some roles may require a minimum depth of knowledge or experience to be able to operate effectively; this may include holding an appropriate level of subject qualification. Depth of expertise is not necessarily grade dependent. Some roles may require people to be effective at a higher level of the professional competency than their current grade in order to deliver their duties successfully. Line managers and staff should consider the requirements of the role and select the indicators that are most appropriate to that role. You should also refer to local guidance from your organisation's HoSEP or HR section and the standards (such as professional qualifications) set by professional bodies in the relevant discipline.

Information about science and engineering professional bodies is available from:

Engineering Council: http://www.engc.org.uk/professional-ethics.aspx

 $\label{eq:council} \textbf{Science Council: } \underline{www.sciencecouncil.org}$

Summary of the Science and Engineering Professional Framework

Competency	High Level Description
Securing, maintaining and developing relevant technical expertise	Holds suitable qualification(s) and undertakes continued professional development where appropriate, seeking learning and development opportunities. Ensures work is of high quality and supports government decision making. Manages information and knowledge appropriately.
Applying scientific and technical knowledge	Demonstrates understanding and application of fundamental scientific/engineering principles. Able to evaluate and question other sources of evidence and contribute to the overall robustness of the evidence base. Understands the business need/relevance of work undertaken by the department. Takes an innovative approach to problems/issues, and understands the importance of Horizon Scanning to inform strategy, develop research plans, etc.
Understanding and complying with statutory requirements and standards	Understands and complies with the statutory (and non-statutory where applicable) requirements. These requirements may arise from legislation, voluntary codes of practice or quality assurance processes etc.
Sustaining and developing the profession	Demonstrates a personal and professional commitment to their profession through leadership or support for cross-government professional development activities within their discipline. Builds networks for self and others to share professional knowledge and know-how. Provides mentoring and assistance to colleagues for their continuing professional development. Explains and promotes the role of the science and engineering profession in the Civil Service and makes an active contribution to its future development.
Overseeing the technical work of others	Demonstrates the skills needed to review, direct and sign-off the technical work of others, as is typically required for those acting as Technical Design Authority/Technical Leader roles. Champions the scrutiny and challenge of technical work, and the early exposure and management of technical risk.

Science and Engineering Competencies

Securing, m	Securing, maintaining and developing relevant technical expertise		
G7/G6/SCS PB1	 Maintains up to date scientific/engineering knowledge Explains the nature and significance of relevant scientific and engineering issues to diverse audiences Publishes research in respected journals where appropriate Actively undertakes Continuing Professional Development (CPD) 		
(Level 4 and 5)	Supports and develops others to sustain and build their technical expertise		
HEO/SEO (Level 3)	 Maintains up to date scientific/engineering knowledge Identifies appropriate sources of information to support their work (e.g. appropriate journals and colleagues) Presents at events/conferences Undertakes pro-active research (anticipating where things might go, rather than how to solve the current problem) Is an active member of the scientific/technical community Takes a questioning and critical approach to existing methodologies Seeks expert guidance from colleagues at any level Has a broad knowledge of the science/technology involved across their project/programme area and can evaluate other's work and link between projects Publishes research in respected journals Seeks out opportunities for Continuing Professional Development 		
EO (Level 2)	 Maintains up to date scientific/engineering knowledge Researches issues through appropriate media, e.g. journals, internet etc. Actively pursues CPD where appropriate Identifies the strengths and weaknesses of the data and research in their specific field Is aware of what colleagues are doing 		
AA/AO (Level 1)	 Maintains up to date scientific/engineering knowledge Undertakes appropriate training to develop technical knowledge Identifies and follows relevant procedures, processes and methods Collates relevant technical data and information accurately 		

Applying sci	entific and technical knowledge
	Applies knowledge experience and skills effectively, providing innovative solutions to problems
G7/G6/SCS PB1	Works effectively on cross-cutting projects and establishes positive links with other professional streams
	Understands longer term and strategic issues related to the projects and programmes
(Level 4 and 5)	Understands the business need and context of the work the organisation undertakes
	Identifies and assesses risk, uncertainties and confounding factors, can respond effectively to unforeseen situations, understands
	the limitations of their own expertise and knows when to call in external experts or flag an issue
	Able to exploit the outcomes of research
	Understands and can explain the strengths and weaknesses of analytical approaches
	 Identifies what questions need to be asked rather than just answering questions that are presented
HEO/SEO	 Makes quality assessments and reviews scientific/engineering content of programmes of work
	 Appraises, advises and makes decisions on measurement approaches, trialling, design etc.
(Level 3)	 Identifies future potential direction for programmes and long term implications and issues
	Guides contractors and staff on appropriate methods for specific projects
	 Identifies and chooses between different methodologies, proposes new approaches to projects and programmes
	Identifies links from broader areas and new technologies
	Gives guidance on technical standards
	Understands the context of their work within the organisation's objectives
	 Understands the limitations of their own knowledge and expertise and knows when to seek further advice, escalate issues and
	highlight the need for further training and development
	 Understands and objectively applies basic scientific/technical principles e.g. gathering information, building evidence, analysing
	information, evaluating the validity of a technique, designing an experiment, defining a theory
EO	Knows when to seek further advice and highlight the need for further training and development
(11 0)	Conducts effective literature searches
(Level 2)	Answers questions on their specific area
	Makes decisions on how to conduct work within their specific tasks
	Understands technical papers and manufacturers' leaflets in the area
	Makes suggestions on the running of the project
	Ensures their work receives appropriate peer review
	Demonstrates a knowledge of fundamental scientific, technical and mathematical concepts, practices and procedures
AA/AO	Records results in the appropriate reporting format
(1 1 4)	Operates and maintains equipment safely and in accordance with instructions
(Level 1)	Ensures that work meets set requirements and is reviewed appropriately
	Identifies when results are unexpected or do not fall within expected parameters, refers to appropriate colleagues

Understanding and complying with statutory requirements and standards		
G7/G6/SCS PB1 (Level 4 and 5)	 Understands how and why the requirements are relevant to their role Understands and explains what needs to be done to satisfy these requirements Understands the role of regulators and can explain this to colleagues Ensures the organisation complies with the necessary requirements Works in accordance with appropriate quality assurance procedures Critically evaluates weaknesses and/or limitations in existing or proposed standards, laws or regulations and makes recommendations for improvements Actively contributes to work to revise standards, laws and regulations 	
HEO/SEO (Level 3)	 Understands how and why the requirements are relevant to their role Understands and explains what needs to be done to satisfy these requirements Understands the role of regulators and can explain this to colleagues Knows some of the detail of the statutory (and non-statutory) requirements Makes junior colleagues aware of the existence of standards Able to set up and oversee safe and ethical systems of work Raises awareness of ethical standards¹ within scientific and technical application Monitors others' compliance Defines, promotes and challenges standards Competent in challenging bad practice and empowered to raise their concerns at an appropriate level 	
EO (Level 2)	 Is aware that the standards exist, follows these standards and knows where to find the detail if necessary. This includes quality management procedures, internal processes and procedures, protocols and regulations Competent in challenging bad practice and empowered to raise their concerns at an appropriate level 	
AA/AO (Level 1)	 Is aware of and can follow appropriate standards for their work Competent in challenging bad practice and empowered to raise their concerns at an appropriate level 	

_

¹ Ethical standards include the statement of ethical principles for engineers www.engc.org.uk/EthicalPrinciples and the ethical code for scientists

Sustaining a	and developing the profession
_	Creates a culture in their organisation so that professional development is valued and supported
	Promotes a culture of evidence-based policy making
SCS	Encourages and mentors individual staff in their professional development
(Level 5)	 Advises on science and engineering capability needs within their part of the organisation and contributes towards workforce planning. Plays an active role in developing talent within the profession and supports postings between organisations to meet wider civil service needs
	Plays a leading role in developing and promoting cross-government professional networks or communities in their discipline
	Builds strategic links with professional bodies to share professional knowledge and know-how and draw in expertise from outside government
	Explains and promotes the role of the science and engineering profession in the Civil Service at Board level and externally
	Advises on science and engineering capability needs within their part of the organisation and contributes towards workforce planning
G7/G6	Plays an active role in developing talent within the profession and supports postings between organisations to meet wider civil service needs
(Level 4)	Promotes a culture of evidence-based policy making and multidisciplinary working
	Understands the importance of scientific advice and evidence in policy making and develops systems and approaches that create a culture of evidence based policy making and proper evaluation of its use
	Provides mentoring and assistance to colleagues for their continuing professional development
	Leads or actively supports cross-government professional networks or communities in their discipline
	Leads by example by maintaining own CPD and participating in external professional networks and events
	Explains and promotes their organisation's science and engineering activity to colleagues and externally
	Supports a culture of evidence based policy making and multidisciplinary working
	Provides mentoring and assistance to colleagues for their continuing professional development
HEO/SEO	Presents to other colleagues on own and team's scientific or engineering activities and shares knowledge
(11 0)	Develops and maintains good links with peers in other teams
(Level 3)	Helps promote the team's activities with colleagues
	Participates actively in external and cross-government professional communities
5 0/44/40	Understands and can explain what scientific or engineering activities they are involved in
EO/AA/AO	Helps organise events and other activities to share scientific or engineering knowledge and know-how
(Level 1 and 2)	Links with relevant peers in other teams across the organisation
	Helps promote the team's activities with colleagues
	Knows how to identify and seek advice from colleagues in other Civil Service organisations

Overseeing	Overseeing the technical work of others		
SCS (Level 5)	 Effective in taking a strategic view of the technical work of the organisation, and able to link this back clearly to Departmental/Ministerial priorities Acts as the formal approver and technical decision maker for the most important pieces of work Sets professional standards for science and engineering within their organisation 		
G7/G6 (Level 4)	 Provides clear technical leadership to major projects, portfolios or programmes or across a wide area of responsibility Highly effective in reviewing technical work across a range of activities, even though this may not fall within their personal area of expertise, utilising the specialist skills of others as appropriate Able to manage complex technical risks and decisions, and to act as the formal sign-off authority for major pieces of work Effective in deciding if and when a piece of work/research needs to change direction or be terminated, and able to recognise the value of what has been achieved Acts as a champion within their area for high professional standards in science and engineering, including high-level mentoring 		
HEO/SEO (Level 3)	 Provides effective technical leadership within a modest project or similar area of scope Fosters openness to technical scrutiny and demonstrates a willingness to uncover and deal with technical problems at the earliest possible stage Ensures that all of the technical work within their area of responsibility is subject to regular review and sign-off, and is personally effective in doing this in areas where they have the requisite specialist knowledge Effective in providing recommendations as to if and when a piece of work/research needs to change direction or be terminated Effective in providing day to day guidance and supervision to more junior members of technical staff, or staff who are still learning on the job Able to strike an appropriate balance between technical quality, cost and timely delivery and works constructively with Project Managers and third party contractors with this in mind Fosters high professional standards in science and engineering, including mentoring of junior staff (whose expertise may be outside of their own area of expertise or discipline) 		
EO/AA/AO (Level 1 and 2)	 Values technical scrutiny from seniors, conducting the work in an open manner and being responsive to the advice and instructions that are received Aware of own technical limitations and proactive in seeking help where necessary Aspires to high professional standards in science and engineering, proactively seeking to improve Flags technical risks at an early stage Able to provide technical supervision to technicians and students in straightforward situations 		

Civil Service Competency Framework – Additional Indicators for Science and Engineering Roles

Civil Service competency	Indicators of effective behaviour for science and engineering roles
Strategic Cluster – Setting	Direction
1. Seeing the Big Picture	 Level 4 (Grade 7/6 and equivalents) Understands how science and engineering fit into the wider work of the department/agency Uses appropriate techniques for horizon scanning and futures analysis to anticipate and predict the long term impact of national and international developments, including economic, political, environmental, social and technological, on own area Works with scientists and engineers to identify risks, uncertainties and emerging issues relating to their activity/policy area and effectively feeds into strategy and big picture considerations Takes a systems view/evaluates interdependencies of technical issues rather than providing a narrow solution to a problem Level 3 (HEO/SEO and equivalents) Alert to emerging science, engineering and technology issues and trends which might impact or benefit own and team's work
2. Changing and Improving	 Level 5 (SCS) Promotes the advantages of scientific and engineering analytical skills and techniques (e.g. problem structuring, data analysis and presentation, management of technical risk and uncertainty, systems thinking) and seeks out opportunities to use these to strengthen departmental boards and decision making Level 4 (Grade 7/6 and equivalents) Uses scientific or engineering skills and approaches to contribute towards organisational or process improvements in own area
3. Making Effective Decisions	 Level 3 (HEO/SEO and equivalents) Synthesises information from a number of specialists to support decisions Uses knowledge of risk to advise policy owners on the feasibility and suitability of current and future policies/initiatives Draws on own and others scientific and technical knowledge and experience to make professional judgements Takes technical decisions balancing technical aspects, cost, effectiveness and safety for in-service and acquisition contexts

Level 2 (EO and equivalents)

- Understands the role of other analytical professions and works effectively with them to ensure an integrated evidence base
- Understands the principles of scientific method and experimental design



Civil Service competency	Indicators of effective behaviour for science and engineering roles	
People Cluster – Engaging People		
4. Leading and Communicating	 Level 5 (SCS) Engages constructively in debate and challenges where appropriate to ensure relevant science and engineering considerations are taken into account in the long-term vision for the organisation and its work Communicates professional views with conviction and clarity and when necessary, acts as a critical friend to senior colleagues within the organisation Inspires science and engineering professionals in own and delivery partners' organisations to engage fully with long-term vision and purpose of the Department, supporting them to make sense of change and identify areas where science and engineering can make a difference Level 4 (Grade 7/6 and equivalents) Communicates impartial technical advice clearly and concisely to both analysts and non-analysts, including limitations of this advice Performs a 'linking'/translating role between the profession and policy makers, or other professionals and clearly explains the significance of technical/specialist issues Understands the risks, uncertainties, gaps, and misinterpretations associated with the evidence base, the implications of these and how to communicate risk and uncertainties effectively Level 3 (HEO/SEO and equivalents) Provides objective and balanced advice including relevant risks and uncertainties and is aware of organisational policy issues when providing this advice Presents effectively to a britical audience, advises colleagues, clients and technical audiences across the project area, sharing information appropriately Manages commercially sensitive enquiries, handling and escalating controversial and politically sensitive issues as appropriate Defines and produces technical and other reports for client and user groups, communicates the interaction between science and policy in lay terms, dealing appropriately with any conflicts between policy and client needs Lev	

	 Understands the risks associated with their area and identifies who needs to be aware of risks and clearly communicates risk to the right people at the right time Produces brief technical documents and first drafts of reports, makes decisions about what is included Sensitive to the boundaries of non-technical audiences, tailors advice and training accordingly and presents credibly to diverse audiences Level 1 (AA, AO and equivalents) Explains clearly the processes and methods used in their work to colleagues and managers Provides general advice on technical issues to internal customers, knowing when to refer queries to more experienced colleagues
5. Collaborating and Partnering	 Level 4 (Grade 7/6 and equivalents) Works in and alongside different areas of the science and engineering base (e.g. academia, industry, government departments and agencies, and international organisations) Forges positive links with science and engineering counterparts in organisations within the UK and overseas, establishes a role within existing networks, previously unmade links between multiple networks, and uses professional bodies to facilitate communication Engages with suppliers, service providers and delivery partners as an intelligent customer to ensure good delivery and shared understanding of the agenda and context Level 3 (HEO/SEO and equivalents) Proactively represents their work both internally and externally, is aware of the extent of potential networks and develops own networks as appropriate across disciplines and beyond technical and end users Develops technical and non-technical networks nationally and across government, industry and academia and knows the key technical experts internationally in their specific areas of work Ensures effective knowledge management within own organisation and wider dissemination where appropriate Displays attributes of an intelligent customer when dealing with suppliers, service providers and delivery to partners to facilitate good delivery and shared understanding of the agenda or context Level 2 (EO and equivalents) Communicates with colleagues to share ideas and increase awareness of what they are doing Builds relationships with clients and other stakeholder contacts (e.g. manufacturers' representatives) specific to their area. Identifies the right people to direct queries to and uses others' contacts Malves contacts with others working in the same field via conferences, training sessions, industry events etc. and effectively networks with technical and end users

		 Level 1 (AA, AO and equivalents) Is aware of others' roles in the team and can explain how these roles link together Develops a support network to help complete their technical/scientific training/qualifications Identifies the right people to seek advice from, networks effectively with internal colleagues
6	6. Building Capability for All	No additional indicators



Civil Service competency	Indicators of effective behaviour for science and engineering roles		
Performance Cluster - Delive	Performance Cluster - Delivering Results		
7. Achieving Commercial Outcomes	Level 5 (SCS) • Has broad knowledge of research paths and funding streams including own organisation's role within them		
	 Level 4 (Grade 7/6 and equivalents) Has an awareness of IP and exploitation issues including the appropriate circumstances and fora in which to discuss technological advances 		
8. Delivering Value for Money	 Level 5 (SCS) Encourages science and engineering staff to work collaboratively across organisational and discipline boundaries to ensure that the Civil Service maximises its strategic outcomes from the science and engineering professionals it employs Level 4 (Grade 7/6 and equivalents) Identifies and pursues opportunities for wider dissemination of government funded research activities to get maximum value and impact 		
	Level 3 (HEO/SEO and equivalents) Manages contracts for scientific and engineering services and research effectively using good practice for project management, codes of practice for ethics and other relevant standards		
9. Managing a Quality Service	Level 5 (SCS) Creates or develops areas where science or engineering work programmes contribute to the objectives of the department/agency Level 3 (HEO/SEO and equivalents)		
	 Works closely with advisers from other professional areas to ensure an integrated evidence base for decision makers Delivers tailored, relevant scientific or engineering advice to colleagues from other professions and seeks feedback to improve service 		
	Draws on own and others expertise to design, supervise and critique work done for their organisation to maintain professional standards		

10. Delivering at Pace

Level 4 (Grade 7/6 and equivalents)

- Understands who will use their work and for what purpose and understands who may be affected, either directly or indirectly, by the results of it
- Recognises the role and interests of stakeholders, e.g. Other Government Departments, statutory bodies, pressure
 groups and members of the public and balances conflicting demands made by stakeholders (including issues of
 time, cost, risk and performance)
- Understands the risks and trade-offs between timely delivery of tasks and conducting full analysis of an issue and ensures that technical advice takes account of appropriate stakeholder issues
- Takes account of the political/policy/operational impact of issues

Level 3 (HEO/SEO and equivalents)

- Understands how the project fits into the broader programme and considers the practical utility of the project/policy to give an objective view
- Uses stakeholders to identify relevant issues and is aware of what other organisations are doing in the field and how their own projects relate to them
- Proactively makes suggestions about how science/technology can be deployed to assist the stakeholder.
 Understands the fundamental political aspects of the project and programme, along with the overarching aims, goals and drivers of the stakeholders. Gathers customer requirements and is able to anticipate changes in stakeholders' aims/goals/needs/funding
- Understands issues and their impact at the organisational, European and international level

Level 2 (EO and equivalents)

- Gathers sufficient information from/about stakeholders to be clear about their technical requirement(s)
- Understands clearly their role in a given project
- Gains the attention of their specific stakeholder audience and builds trust with end users

Level 1 (AA, AO and equivalents)

- Identifies when there may be difficulties in meeting customer or colleague requirements and seeks appropriate, timely advice
- Understands how their role relates to the work of the team

Using the professional framework for recruitment and appraisal

The below example illustrates how the Civil Service core competencies and the science and engineering skills framework might be taken together to sift and select candidates for interview and a role. Competencies marked '*' taken from one level higher than the post (ie level 4 vs level 3). This is acceptable in a small number of instances where key to the role:

Role: Technical secretariat to scientific assessment panel (SSO)

Responsibilities:

- Managing secretariat team and links with relevant research activity and policy development
- Preparation of technical briefing and advice on assessments and emerging issues
- Secretariat duties including drafting agenda and minutes of panel
- Publication and support for communications on panel decisions, long term policy and emerging issues or incidents
- Managing relations with industry and NGOs and with European and international counterparts

Competencies and criteria for role:

Framework	Competency	Key indicators for sift/interview
Civil service	Making effective	Synthesises information from a number of specialists to support decisions.
	decisions	[plus other indicators from CS Competency Framework]
Civil service	Leading and	Communicates impartial technical advice clearly and concisely to both analysts and non-analysts, including limitations of this
	communicating	advice.*
		Presents effectively to a critical audience, advises colleagues, clients and technical audiences across the project area, sharing
		information appropriately.
		[plus other indicators from CS Competency Framework]
Civil service	Managing a quality	Works closely with advisers from other professional areas to ensure an integrated evidence base for decision makers.
	service	[plus other indicators from CS competency framework]
Professional	Applying scientific	Identifies what questions need to be asked rather than just answering questions that are presented.
	and technical	Makes quality assessments and reviews scientific/engineering content of programmes of work.
	knowledge	Appraises, advises and makes decisions on measurement approaches, trialling, design etc.
		Identifies future potential direction for programmes and long term implications and issues.
		Identifies links from broader areas and new technologies.
Professional	Understanding and	Understands the role of regulators and can explain this to colleagues.
	applying statutory	Ensures the organisation complies with the necessary requirements.*
	requirements	Able to set up and oversee safe and ethical systems of work.
		Monitors others' compliance.

Essential skills and qualifications – Degree level qualification in a relevant scientific subject **Desirable** – a higher level degree qualification