Science and Engineering Skills Framework

Introduction

This document represents the skills framework for the Science and Engineering profession within the Professional Skills for Government (PSG) initiative. It outlines the job-related professional expertise that scientists and engineers are expected to have at the following levels:

- SCS Pay Band 1
- Grade 7/Grade 6 (Range 10/11 equivalent)
- HEO/SEO (Range 7 – 9 equivalent)
- EO (Range 5 and 6 equivalent)
- AA/AO (Range 2 – 4 equivalent)

This should be read in conjunction with your Department's guidance on PSG. Further information can also be found on the PSG web site, http://psg.civilservice.gov.uk/.

Who is it for?

This framework should be applied to staff working in science or engineering posts, this usually encompasses posts where professional qualifications and experience are directly relevant to the work being undertaken. The framework is also applicable to staff who classify themselves as falling within the Science/Engineering PSG group or those who consider science or engineering to be their career 'anchor'.

Using the Framework

The primary audiences for this document are departmental Heads of Science and Engineering Profession (HoSEPs), Human Resources (HR) sections, and those responsible for implementing PSG within departments and their agencies. It is expected that these groups will use the framework and associated descriptors to establish standards and criteria that are applicable in their areas. The framework may also be of interest to individual scientists and engineers.

In producing local guidance it is expected that HoSEPs and HR sections will modify the examples as appropriate. For ease of reference a high level description of each competency is provided. HoSEPs and HR sections may choose to include these descriptors in local guidance but verbatim duplication of this text is not required. It is, however, essential that any local guidance fully reflects the context and spirit of this text.

Staff at or aspiring to SCS Pay Band 1 should be able to demonstrate all of the skills described for Grade 6/7 as well as the additional skills outlined on page 9.

Science and Engineering Skills Framework

Competency	High Level Description
Maintain and develop 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.
Application of 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.
Statutory requirements	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.
Networking and influencing	Ensures that the profession has a high profile within and across departments. Able to form links to ensure that "joined up" advice can be provided. Maintains effective links with scientists, engineers and policy makers, both within and outside of government.
Stakeholder management	Understands who may be affected by the results of their work and in what way. Ensures that scientific and engineering activities add value to the overarching objectives of the field. Builds trust and positive relationships with diverse stakeholders.
Communicating with impact[1]	Communicates technical/specialist information to non-specialists clearly, concisely and persuasively. Provide objective and balanced advice, ensuring any limitations are understood.

Pay Band 1	
Apply a wide understanding of the science and engineering base	Act as an effective interface between board level management and the science and engineering community. To champion the profession more widely, through identifying areas where science and / or engineering can contribute to an organisation's aims; highlighting how the profession's intellectual skills associated enhance the strategic and decision making abilities of senior management and boards.

[1] Communication is also a Core Skill in the PSG Framework

Professional Knowledge and Expertise

Secure, maintain and develop 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 • Actively undertakes Continuing Professional Development (CPD) • Supports and develops others to sustain and build their technical expertise
HEO/SEO	• 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 can evaluate other's work and link between projects
EO	• Researches issues through appropriate media, e.g. internet, journals 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	• Holds the appropriate level of academic and professional qualification relevant to the job • Undertakes appropriate training to develop technical knowledge • Identifies and follows relevant procedures, processes and methods • Collates relevant technical data and information accurately

Professional Knowledge and Expertise

Apply scientific / technical knowledge	
G7/G6/ SCS PB1	• Applies knowledge experience and skills effectively, providing innovative solutions to problems • 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 • Understands the business need of the work the organisation undertakes • Identifies and assesses risk, can respond effectively to unforeseen situations • Ability to exploit the outcomes of research
HEO/SEO	• Identifies what questions need to be asked rather than just answering questions that are presented • Makes quality assessments and reviews scientific/engineering content of programmes of work • Appraises, advises and makes decisions on measurement approaches , trialling, design etc • 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
EO	• Understands and objectively applies basic scientific/technical principles e.g. gathering information, building evidence, analysing information, evaluating the validity of a technique, design an experiment, define a theory. • Conducts effective literature searches • 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
AA/AO	• Demonstrates a knowledge of fundamental scientific, technical and mathematical concepts, practices and procedures • Records results in the appropriate reporting format • Operates and maintains equipment safely and in accordance with instructions • 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

Professional Knowledge and Expertise

Understand and comply with the statutory (and non-statutory) requirements of my current role	
G7/G6/ SCS PB1	• 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 • Comments on weaknesses and / or limitations in existing or proposed laws or regulations
HEO/SEO	• Knows some of the detail of the statutory (and non-statutory) requirements • Makes junior colleagues aware of the existence of standards. • Raises awareness of ethical standards within scientific and technical application. • Monitors others' compliance • Defines, promotes and challenges standards
EO	• Is aware that the standards exist and follow these and know where to find the detail if necessary. This includes Health and Safety, quality management procedures, and procedures, protocols and regulations
AA/AO	• Is aware of and can follow appropriate standards for their work (e.g. Health and Safety)

Professional Knowledge and Expertise

Communicating with impact	
G7/G6/ SCS PB1	• Communicates impartial technical advice clearly and concisely • Communicates technical advice clearly to both analysts and non-analysts, including limitations of the advice (e.g. in the absence of complete data) • Performs a 'linking'/translating role between the profession and policy makers, or other professionals. • Clearly explains the significance of technical / specialist issues (e.g. risk) • Synthesises information from a number of specialists to support decisions
HEO/SEO	• Provides objective and balanced advice • Presents effectively to a critical audience • Advises colleagues, clients and technical audiences across the project area, sharing appropriate information • Manages commercially sensitive enquiries, passing on controversial and political issues as appropriate • Is aware of organisational policy issues when giving advice • Defines and produces technical and other reports for client and user groups • Handles politically sensitive and controversial enquiries, knowing when to refer to more senior colleagues • Communicates the interaction between science and policy in lay terms, dealing appropriately with any conflicts between policy and client needs
EO	• Provides objective and balanced information • Provides factual answers to questions relating to your work and advise senior colleagues on this work • Identifies when a question has controversial / political/commercial implications and handles appropriately • Produces brief technical documents and first drafts of reports, making decisions about what is included • Is sensitive to the boundaries of non-technical audiences and tailors advice and training accordingly • Presents credibly to diverse audiences
AA/AO	• 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

Professional Knowledge and Expertise

Networking and influencing	
G7/G6/ SCS PB1	• Forges positive links with counterparts in organisations within the UK and overseas • Establishes a role within existing networks • Establishes previously unmade links between multiple networks • Uses professional bodies to facilitate communication
HEO/SEO	• Proactively represents their work e.g. at international conferences • Is aware of the extent of the potential networks and develops their 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. • Knows the key technical experts internationally in their specific areas of work
EO	• 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 • Makes contacts with others working in the same field via conferences, training sessions, industry events etc. • Effectively networks with technical and end users
AA/AO	• 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

Professional Knowledge and Expertise

Understand the needs and constraints of stakeholder communities	
G7/G6/ SCS PB1	• Understands who will use their work and for what purpose • Understands who may be affected, either directly or indirectly, by the results of their work • Recognises the role and interests of stakeholders, e.g. Other Government Departments, statutory bodies, pressure groups and members of the public • Balances conflicting demands made by stakeholders (including issues of time, cost, risk and performance) • Ensures that technical advice takes account of appropriate stakeholder issues • Takes account of the political / policy / operational impact of issues
HEO/SEO	• Understands how the project fits into the broader programme • Uses stakeholders to identify relevant issues • Is aware of what other organisations are doing in the field and how their own projects relate to them • Considers the practical utility of the project/policy to give an objective view • Proactively makes suggestions about how science/technology can be deployed to assist the stakeholder • Understands the fundamental political aspects of the project and programme • Understands the overarching aims, goals, drivers etc. of the stakeholders and gathers customer requirements • Understands issues at the organisational, European and international level. • Anticipates changes in stakeholders' aims/goals/needs/funding
EO	• Gathers sufficient information from/about stakeholders to be clear about their technical requirement • Understands the point of their part of the project • Gains the attention of their specific stakeholder audience • Builds trust with end users
AA/AO	• Identifies when there may be difficulties in meeting customer or colleague requirements and seek appropriate advice • Understands how their role relates to the work of the team

Pay Band 1 only

Apply a wide understanding of the science and engineering base	
PB1	• Understands how science and engineering fit into the wider work of the department / agency • Has broad knowledge of research paths and funding streams • Promotes the advantages of scientific / engineering intellectual skills (e.g. problem structuring, data analysis and presentation, management of technical risk, etc.) and highlights how these will strengthen departmental boards and decision making • Works in and alongside different areas of the science and engineering base (e.g. academia, industry, government agencies, government departments and international organisations) • Has created or developed an area where a science or engineering work programme is contributing to the objectives of the department / agency
G7/G6	
HEO/SEO	
EO	
AA/AO	