Industry skills expectations for new and experienced graduates (example 1)

[TUTORS NOTE. The information presented below can be used to acquaint undergraduates or postgraduates with the types and levels of skills and attitudes employers expect in graduates and therefore the types and levels of skills they should aspire to acquire during the course. It may be helpful for students to discuss their interpretation and understanding of some of the descriptors used.
Rather than presenting the whole document to undergraduates it may be more appropriate that tutors edit the material and present only the clearest and most appropriate descriptors in each section. This allows a shorter document to be used and also customises the material appropriately for particular disciplines or levels of student. A shortened version of the document including only the underlined headings can be obtained HERE.]

Industries have expectations that both new and experienced graduates will possess certain attributes and be able to use important skills. These abilities will be subject to the normal appraisal process used to assess the performance of graduates in post. There are, of course, a number of different assessment/appraisal schemes in use which have been developed and are used in particular companies. The material set out below derives mainly from the pharmaceutical industry and outlines some of the typical features and criteria which are used in such schemes.

The specific skills which are assessed/appraised are:

1. Scientific / Technical
2. Problem Solving
3. Communication
4. Teamwork
5. Management for Results
6. Social Awareness
7. Self-control
8. Self-development
9. Change Management
10. Leadership

Each is defined by a set of level descriptors. Graduates are not expected to achieve the

same level with respect to each skill. For example, normal graduate performance in

scientific / technical areas would be level 3 or 4 while only level 1 would be expected with

regard to leadership.

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1. Scientific / Technical Skills

These involve:

technical expertise in maintaining, building and applying in-depth understanding of the

concepts, techniques and knowledge associated with disciplines, to current challenges and

issues;

rigour / discipline in paying attention to details of procedures, methods, plans, etc., to ensure
completeness, to maintain high quality, to eliminate mistakes and errors.

LEVEL 3: Is skilled and independent at technical skills

Demonstrates precision and accuracy in their work
- obtains reproducible results in main area of experimental expertise
- transfers methods successfully to/from others

Can optimise parameters to improve an existing method
- modifies experimental procedures supplied by supervisor or obtained from literature

Analyses and reports data
- capable of simple interpretation
- understands required calculations
- uses advanced computer applications when appropriate
- reports limits and caveats associated with a set of results
- uses appropriate judgement in interpreting and sharing results

Develops and maintains technical skills
- attends and has basic understanding of technical seminars and workshops
- independently reads the literature that directly applies to key tasks in the laboratory
- capable of reading applicable material, with a general understanding of main points

Demonstrates sufficient cross-functional awareness to allow constructive interaction with customers

LEVEL 4: Modifies, designs and applies technical and scientific skills to advance project

Modifies and optimises existing laboratory procedures
- recognises and adopts variations that increase accuracy and efficiency of procedures
- redesigns procedures to eliminate flaws
- quickly modifies procedures to reflect variation in project requirements
- applies methods from other laboratories under minimal supervision
- modifies established laboratory methods through changing reaction conditions, instrument, analytical and modeling parameters

Appropriately handles data / information
- draws conclusions only when experiment verified or reproduced
- uses appropriate judgement in interpreting and sharing results

Sets up and evaluates complex established methods and techniques
- sets up and performs complex calculations as appropriate
- defines what can and cannot be done with particular approaches, techniques, methods or procedures
- is able to evaluate functionality in newly set up methods

Reads, understands and applies appropriate literature knowledge in related area
- able to identify useful information within an article
- cites detailed empirical or theoretical support for a particular approach for addressing an issue or problem
- uses comprehensive (current and past) knowledge of literature in the discipline to modify experiments, methods, procedures etc. leading to improvements in lab performance

Designs and implements own experiments
- understands and routinely reproduces literature methods under minimal supervision
- rapidly selects and applies appropriate techniques to solve problems
- asks peers to review / evaluate plans and findings
- champions "best practices" and standards in design and development of experiments and analyses

Interprets data appropriately
- recognises inconsistencies

- requests details when inconsistencies are identified
- invokes and follows investigation of aberrant data when required
- calls attention to experimental or scientific information that questions prior findings or current direction
- interprets biological data from own experiments
- evaluates differences between theoretically predicted and experimental results

Follows standard procedures to minimise errors or unnecessary risks despite time and resource pressures

Acts as an expert resource for team
- provides advanced technical advice, training and guidance to team members
- displays a broad understanding of relevant discipline
- displays an overall understanding of science issues related to area

Sets up appropriate computer applications to improve efficiency
- able to customise application to improve performance
- demonstrates capability in database searching, library information systems, biology data sources

Applies appropriate statistical and mathematical analyses in making scientific interpretation
- uses computational techniques to analyse large datasets, to derive predictive models or evaluate data trends

Contributes scientific expertise as a co-author
- contributes to papers, patents, internal reports, evaluations and justifications
- contributes to conclusions as well as methods and procedures

2. Problem Solving Skills

These involve:
systematic thinking (i.e. taking a logical and objective approach to analysing problems, organising work and planning activities), *conceptual thinking* (i.e. identifying key issues or structures in complex situations, in complex problems, or in areas outside immediate technical discipline) and *creativity* (i.e. generating and championing new ways to analyse problems, solve problems, or address problems).

LEVEL 3: Finds solutions for technical problems around experimental work

Uses step by step plans when beginning a project or addressing a problem

Anticipates and takes measures to eliminate potential problems
- anticipates and plans for likely obstacles to execution of particular activities; is mindful of potential problems and intercedes effectively e.g. to manage reagent or equipment availability
- pro-actively interacts with other laboratories providing results or material

Prioritises activities based on implications for the problem as a whole

Evaluates established methods to find solutions
- quickly learns how to apply new disciplines or unfamiliar techniques to existing problems
- selects and evaluates literature methods and other resources and adapts to own situation

Coherently organises unstructured, complex, or voluminous information

LEVEL 4: Uses novel solutions and/or unprecedented methods to solve technical problems

Uses internal and external resources to find solution(s)
- consults among lab groups to solve problems
- solves problems by collaborating with others and by collating and interpreting data from many sources

Acts as an unbiased resource for the assessment of proposals, findings, etc.
- rethinks assumptions when data fail to support predictions
- determines potential mismatches between findings and expected results that suggest next steps or possible explanations
- uses understanding of underlying principles to master new procedures, methods, concepts, or systems
- questions assumptions implicit in standard procedures and techniques when faced with unexpected or discrepant results or intractable problems
- discusses problems with appropriate consultants

Able to prioritise and enact a prioritised sequence of problem solving events
- creates specific timelines and resource estimates for handling large assignments (e.g. provision of support services to other laboratories)
- partitions approach into well-defined component elements
- refocuses or redesigns projects to ensure they are compatible with current strategy
- develops robust and compelling methods to evaluate hypotheses or proposed solutions
- identifies and does the critical experiments first

3. Communication Skills

These involve:
providing information so that others can understand technical ideas or processes and
information networking to systematically and continually optimise information resources
needed for evaluating issues and making decisions

LEVEL 2: Communicates effectively within the team

Effectively presents own work to team
- presents background, data and conclusions
- is concise, brief, to the point and does not ramble
- deals effectively with questions and comments

Communicates in a professional, respectful and appropriate manner
- states own ideas effectively while exercising diplomacy

Can write a logical, clear and correct procedure

- maintains coherent, accurate and complete records of experiments
- keeps accurate, complete, reproducible and up-to-date notebooks and/or database entries

Displays good listening skills with varied groups
- actively seeks to understand the perspective of the speaker
- receptive to other people's points of view

Contacts other departments as appropriate to ensure information is exchanged or services are provided

LEVEL 3: Displays concern for impact of communication

Presents results in formats that are readily understood
- presentation is effective, organised, legible (or audible), contains minimal grammar and spelling errors and has readily recognisable conclusions or recommendations
- effectively uses all forms of communication (speaking, formal and informal writing, IT)
- prepares effective visual aids for presentations - readable and comprehensible diagrams, flow charts and tables

Understands audience needs and tailors delivery of information accordingly
- understands what needs to be communicated (details or just bottom line)
- understands when it should be communicated (immediately or at next routine team meeting)
- understands level at which communication is appropriate (supervisor, project manager, departmental head)
- understands how it should be communicated (one-to-one, team meeting, email, written note)
- maintains audience interest and attention
- able to deal appropriately with questions

Prepares clear reports
- prepares concise, clear and accurate memos, reports and technical documents with appropriate IT
- effectively summarises and distributes data
- shares information via database or network

Accepts and gives constructive feedback to any team member
- has the courage to ask for clarification
- employs a manner which is non-threatening
- acts on feedback from practice presentation (or initial draft) to enhance future presentation
- modifies communication style based on feedback from listeners

Provides useful and timely input during group discussions

Capable of effectively representing the team to make contact with other areas

4. Teamwork Skills

These involve:
collaborating with others toward a common goal and *mentoring* (personally supporting the development of others).

LEVEL 2: Shares information and resources with others, shares workload of the team and acts on constructive feedback

Supports team decisions and focuses work on agreed team priorities
- may not necessarily agree with a team decision, but is committed to acting on it

Endeavours to fit in with the team
- develops a positive relationship with individual team members
- values all roles and contributions

Respects confidentiality

Shares information, expertise, or resources with others
- shares workspace, supplies and equipment
- readily provides information when requested

Shares in the workload of the team
- shares team goals and objectives
- makes time available to support others

Seeks, accepts and acts on constructive feedback

LEVEL 3 Contributes to the decision making and coaches individuals with developmental needs

Makes optimum use of group resources (e.g. common equipment, technical support)
- uses group resources in a considerate way, and in a manner consistent with best meeting overall team goals

Acknowledges the contributions of others and shares credit appropriately
- recognises publicly those who contribute to successful completion of tasks

Reaches beyond the individual assignment to assist in reaching team goals
- organises and encourages participation in casual team meetings to build positive team interaction
- voluntarily assists others in their assignments

Participates in team decision making
- respects and values individual decisions
- provides input to team decisions on other's data in addition to their own
- compromises own position / priorities when necessary for the good of the team or project

Has an optimistic outlook that contributes to team needs
- encourages others to be the best they can be
- makes an effort to build morale of co-workers
- shows appropriate empathy with team members
- creates a positive and welcoming atmosphere where people are accepted
- helps to create a team identity

Shows good communication with team members
- seeks and provides information when needed
- proactively shows a willingness to share useful information with the team
- makes sure other scientists on the team are aware of the progress of a sub-teams so that all can make the best decisions

Responds to changing priorities and unexpected demands
- covers for others during absence or when help is necessary
- flexible in taking on other team roles
- willingly changes projects to support the major goals of the team

Approaches and coaches others when appropriate
- offers help, advice and support to colleagues and others
- ensures all members are able to contribute
- champions diversity as an effective way to broaden the thinking of the team

5. Manage for Results Skills

These involve:

Achievement Orientation, energetically pursuing unique or distinctive and measurable accomplishments that involve the overcoming of obstacles, competition and the need for extended levels of effort; *Results/Resources Orientation*, modifying procedures, practices and priorities to optimise the use of resources and maximise the chances of success; *Concern for Standards*, pursuing excellence in line with the organisation's norms and values. Attaining the highest standards in every aspect of work - methods, systems, procedures and outcomes; and *Efficiency Orientation*, looking for the best use of resources. Focusing on the means by which outcomes are secured and on the optimum ratio of inputs to outputs

LEVEL 2: Keeps own activities aligned with delivering team results in a timely manner

Organises how to go about performing a specific task
- readies supplies and equipment for next day's experiments

Prioritises own work appropriately with guidance from supervisor

Regularly tracks personal progress against milestones or goals
- monitors progress against personal objectives

Self disciplined when dealing with disagreeable tasks

Focuses on completing all planned responsibilities on time

Determines whether results have been achieved

Actively looks for opportunities to reduce wasted materials, time etc.

Takes action to ensure consistent application of procedures/systems

Knows the team objective
- knows team key performance indicators

Strives to ensure own activities help the team meet objectives
- helps the team deliver on customer expectations
- helps the team to meet service level agreements

Follows good meeting practices when participating in meetings
- helps meeting adhere to agenda/objective

LEVEL 3: Searches for ways to improve delivery of own results aligned to team deliverables

Independently organises own schedule
- uses downtime to start additional activities
- organises activities to run in parallel rather than sequentially

Prioritises work appropriately, focuses on activities critical to the problem at hand
- acts to avoid unnecessary distractions from key objectives
- distinguishes between priority and non-priority tasks
- knows the project plans which apply to their activities
- understands and uses the decision criteria which apply to their activities on a project
- sets priorities when dealing with limited resources

Makes sure that work and/or products are completed in an accurate and timely fashion
- ensures that work meets quality standards

Sets own objectives (where appropriate)
- understands team objectives and the relationship to own objectives
- uses SMART principle in objective setting
- measures performance by results not actions

Actively seeks ways of improving current methods, systems, processes and structures etc.
- acts to eliminate unnecessary risks
- redesigns processes to reduce the amount of time needed to complete them
- designs solutions that make use of readily available equipment, materials, etc.

Organises and brings resources together to achieve an objective

Encourages others to link their actions to team objectives
- uses performance measures to engender superior performance
- questions whether all current activities are necessary to maintain high productivity and / or quality

Understands the priorities relevant to the team and how these fit the bigger picture

Operates effective meeting practice
- may act as leader
- may act as facilitator

6. Social Awareness Skills

These involve:

understanding others, sensing others' feelings and perspective, and taking an active interest in their concerns and *organisational awareness,* reading a group's emotional currents and power relationships

LEVEL 1: Understands the importance of other perspectives

Demonstrates ability to listen well and remains attentive to emotional cues
- is aware of non-verbal communication e.g. tone of voice, facial expressions
- refrains from interrupting others

Able to sense changes in other people's mood or temperament

Asks questions to solicit other's perspectives
- restates in own words to check understanding

Promotes a friendly, co-operative climate
- acts on requests for help or to work co-operatively

LEVEL 2: Demonstrates sensitivity to others

Exhibits consideration of the feelings of others before taking action
- able to listen and sympathise with other viewpoints
- responds appropriately to demands from customers / colleagues

Treats each person as an individual based on observations of others' differing styles
- makes an effort to get along with people with a different style
- aware of own personal prejudices, biases and experiences
- challenges bias and intolerance of other's styles
- modifies behaviours to work effectively with team members

Demonstrates sincere concern and interest for other people
- is approachable
- maintains an open door policy

- offers useful feedback and/or mentors others (beyond supervisory responsibilities)

Develops incidental relationships
- demonstrates a knowledge of the inter-relationships of the other labs or teams working on a project
- creates open channels of communication
- cultivates informal networks
- builds rapport and keeps others in the loop

Able to distinguish between the content of what is being said and the underlying emotions and concerns
- checks for consistency between verbal and non-verbal behaviour
- listens willingly to ideas and concerns expressed by others

7. Self-control Skills

These involve:
continuing to perform effectively in stressful and difficult circumstances

LEVEL 1: Understands need to control emotions

Takes accountability for own actions
- follows through, lives up to commitments

Raises problems openly and without attacking others
- treats others fairly and consistently

Demonstrates good time management
- resists seemingly urgent but actually trivial demands
- remains focussed despite distractions

Recognises how own feelings affect performance

Demonstrates the ability to control and filter emotions in a constructive way
- does not disturb others in times of personal stress
- stays positive even in trying moments

8. Self Management Skills

These involve:
ability to learn, quickly understanding and applying information, concepts and strategies; *accurate self assessment*, knowing one's strengths and limits and *self-development orientation*, taking continuous action to improve personal capability

LEVEL 2: Seeks feedback and work-related knowledge

Seeks, accepts, and acts on constructive feedback

- respects and uses feedback from others to build on personal strengths and weaknesses
- creates own development plan with input from others
- takes time to reflect and learn from previous experiences

Seeks opportunity to build knowledge in work related areas
- develop contacts with expert resources, both internal and external, when appropriate

Quickly understands what new tasks / job requires
- easily learns new information regarding changing projects, processes, etc.
- quickly learns how to work with new business, lab, and information technologies

LEVEL 3: Regularly assesses own performance and strives for self-development

Reflects systematically on own performance and modifies behaviour accordingly
- appraises own strengths and weaknesses realistically
- modifies behaviour in order to reach a goal
- incorporates personal development areas into individual objectives
- measures own performance by results not actions
- actively seeks to do things better

Quickly understands and uses processes, technologies and ideas that are continually being updated

Continually "scans" and applies developments in own discipline

Actively develops knowledge of how own job is affected by other areas and business issues

Displays confidence while taking on new responsibilities
- confident in own ability to overcome barriers

9. Self Management Skills
These involve:
Adaptability, maintaining effectiveness in different situations, environments and cultures and
Change Catalyst, initiating or managing change

LEVEL I: Adjusts own behavior to the environment

Behaves consistently with company values

Is effective when dealing with people from a variety of backgrounds

Implements changes after a suitable adjustment period
- shows a positive attitude when asked to operate in a diferent way
- remains open to different suggestions
- gives "new ways of doing things" a chance

Recognises the need for change

LEVEL 2: Maintains effectiveness in different environments and periods of change

Adapts own style of interaction when dealing with individuals from different backgrounds or cultures

Is among the first to implement a requested change

Continues to perform effectively during periods of high ambiguity
- remains optimistic, focuses on positive expectations

Identifies situations in which a change in process or approach would improve efficiency

10. Leadership Skills

These involve:

Initiative, undertaking necessary activities without waiting for detailed instruction or guidance; *influence / persuasion*, anticipating and addressing other's concerns or interests in ways that build their support for technical objectives; *technical leadership*, demonstrating a strong belief in one's own scientific vision, decisions, abilities and skills despite the resistance of others

LEVEL 2: Implements and completes tasks as a participant

Designs the simple "how" and collaborates on the complex "how" to perform an assigned task
- recognises own technical limitations and seeks necessary technical resources or guidance when confronted with a problem beyond their capability

Seeks to join and be involved
- seeks personal challenge
- welcomes or invites additional responsibilities

Demonstrates good self-esteem and confidence when dealing with people
- demonstrates appropriate assertiveness

Takes action to have an intended or desired effect on others
- lobbies key people to get agreement
- works with informal as well as formal systems to influence situations
- effectively communicates in order to influence at all levels