

Example application for Chartered Biologist: Microbiology example

Application: Chartered Biologist

Job Title: Scientist

Competencies

1. A1. Explain how your skills and knowledge in biological science inform and impact on your work and career development.

I have an honours degree in Microbiology, along with 25 years of experience working within a Microbiology laboratory.

During my degree I learned essential microbiological skills such as aseptic technique, pour plate method, spread plate method, streak plate technique, use of an autopipette, serial dilutions, and the use of selective media. These skills allowed me to gain a position as Assistant Scientist within the Microbiology Laboratory with Northumbrian Water.

The depth of knowledge and understanding of microbiology that I gained during my degree assisted my career progression as I was given the opportunity to progress to the position of Senior Analyst. At this time new regulations for the analysis of *Cryptosporidium* were introduced by the Drinking Water Inspectorate (DWI), and it was my responsibility, alongside my fellow Senior Analyst, to gain the license to allow the laboratory to legally test for *Cryptosporidium*. This involved writing a new Standard Operating Procedure and several Technical Instructions; recruiting and training ten new members of staff; equipping the newly built laboratory; validating the method and then successfully passing audit by the DWI. I was also involved with the Standing Committee of Analysts, and contributed to the writing of The Microbiology of Drinking Water (Blue Book) Part 14 – Methods for the isolation, identification and enumeration of *Cryptosporidium* oocysts and *Giardia* cysts.

As the regulations evolved the *Cryptosporidium* team merged back together with the Microbiology team. My current role is Scientist within that team, and I jointly supervise 26 Analysts. The skills that I learned during my degree are the foundations upon which all work is undertaken in my workplace today and are essential within a microbiology laboratory. On two occasions I have acted as Laboratory Team Leader to cover maternity leave. I acquired the leadership skills for this role through my years of experience within the industry, in addition to undertaking management training.

2. A2. Show how you continue to develop your interest in biological science and what effect this has on your work

There are scientific developments across the industry continually, and it is essential that our team keep up with any advancements relevant to our business. I attend events which are relevant to my role in order to ensure that the methods that we are applying in the laboratory are current.

In January 2020 I attended a one-day seminar hosted by UKWIR (UK Water Industry Research Limited); 'Cryptosporidium: Enhancing the Water Industry's Capability to Respond'. During the event there were various presentations on the subject of *Cryptosporidium* slide genotyping, and the challenges, limitations and improvements to the genotyping process. There were also presentations from Scottish Water, United Utilities and Metropolitan Water (South California) and the DWI. The information that I took away from the seminar was essential to our business. I took notes at the event, and then presented them to the relevant members of my team. As a result of this we made a change to the type of slide which we send to the Crypto Reference Unit to be genotyped.

In May 2022 I attended a Standing Committee of Analysts (SCA) Meeting. The topics on the agenda covered various subjects within the microbiology of drinking water. The SCA publishes guidance on 1 Naoroji Street, London WC1X 0GB | registers@rsb.org.uk | +44 (0)20 3925 3440 | www.rsb.org.uk

methods of sampling and analysis of waters. The committee is made up of scientists throughout the industry, and the meetings are to review and agree on updates to the publications. Following this meeting I discussed with my senior colleagues the possibility of trialling a new product to determine the most probable number of Coliforms and E.coli in water samples. The product would give us an alternative to the product we currently use, and could be more cost effective.

I regularly consult the blue book publications produced by the SCA, and ensure that the methods that we are applying in the laboratory reflect current practise throughout the industry. This frequently results in questions which are often then put to the Accreditation Team Manager. The Accreditation team manager will then liaise with other experts throughout the industry, and current practises are shared. This allows us to draw on experience from other laboratories

3. A3. Demonstrate how you use critical thinking and problem solving to draw conclusions from scientific and other data as you develop courses of action

A major part of the work we perform in our laboratory is Quality Assurance. We perform extensive Quality Control processes alongside all of our real samples in order to ensure that our methods are performing, and that the results we produce are accurate. It is my responsibility to monitor this rigorous QC system.

For every run of samples a QC result is generated, and plotted onto a Shewart chart specific for that determinand. The charts have warning and action limits, and every day I examine the charts. I check for certain situations within each chart, which might be cause for investigation, such as a breach of an action limit; 2 consecutive warning limit breaches; a trend or a bias.

If an investigation is necessary I check all records relating to that result such as calibration records, media production, expiry dates, autoclave and incubator temperature traces, control set-up, analyst training. I speak to the Analyst responsible for the sample to find out if there was anything different that might have resulted in a particular result or set of results.

Upon completion of the investigation I decide and justify if the sample results are valid or not, and decide on a course of action. This could be re-training of an Analyst; discarding a batch of media; reviewing the chart limits; produce additional guidance for Analysts; or it could be that sample results are withdrawn.

The criteria is set in order to prompt investigation, however I also look at the data over a larger period of time to identify any broader issues that may not be picked up by this criteria.

4. B1. Show how you operate your role as a biologist with autonomy, accountability and integrity

I was tasked with the responsibility of setting up and maintaining a set of equipment as part of an emergency planning project. The equipment must be kept secure, and available for emergency events. I spent a considerable amount of time sourcing the equipment, and adapting it to suit the requirements. I did this independently in a secure store room.

Training exercises are held with senior members of staff, and after each exercise I have a feedback meeting with the Laboratory Manager to discuss any changes to protocol or equipment which might be required. It is then assumed that I will make those changes independently.

This is an ongoing project, and an important responsibility as the business is relying on me to ensure the equipment is available in the event of an emergency.

I was asked in 2017 to be mentor to an Apprentice within my team. This was a new position for our team, and indeed the whole of the Scientific Services department, and therefore there was no-one with experience to call upon for guidance. Difficulties with the college meant that it was my responsibility to the apprentice and to the business to figure out what the apprentice needed to achieve over the next 2 years in order to be successful.

I worked with the apprentice throughout the 2 years to ensure that they received the correct level of training and support to equip them with the required level of knowledge, skill and experience. I organised the End Point Assessment and spent time with the apprentice, revising and discussing answers to possible questions.

In October 2019 I facilitated the End Point Assessment and ensured that it was conducted professionally. The overall outcome for the Apprentice was 'Distinction'.

Although the outcome was very much due to the work of the Apprentice themselves, my contribution was to ensure that the resource was available for him to be able to achieve that outcome. It was an excellent achievement and reflected very well on both the Apprentice, myself and the Microbiology team. The Apprentice was then given a permanent role in the Microbiology team as Analyst 2; and is currently working towards progression to Analyst 1.

5. B2. Describe how you reflect on possible improvements in areas of responsibility and offer suggestions to make these improvements

The performance of the laboratory is constantly under review, and improvement suggestions are considered regularly. I encourage all staff to offer suggestions for consideration, both during their appraisals and at any other time. I discuss suggestions for improvement formally at Senior staff meetings, where it is a standing item on the agenda.

When the Cryptosporidium and Microbiology teams merged it became apparent that the distribution of the workload was not even throughout the sections as, although staff were undertaking training across the teams, because there was no visibility through to each lab, the team were unable to see where help needed to be prioritised. I suggested that we reorganise the equipment in the lab so that we could move the Cryptosporidium method into the main Microbiology lab. This idea was implemented, and now staff are able to see which section might require extra help at any given time.

Over the past 2 years the team has grown significantly, and earlier this year I realised that the training had stagnated, and we were struggling to create movement and flexibility throughout the team. I reorganised the training records and developed a planner which allowed us to organise the training more effectively. The result of this is that the training speeded up and more training was completed, and the training plan is now back on track.

More recently it was suggested that the Crypto paperwork was time consuming, with a lot of repetition, particularly around writing the date, and batch numbers of reagents. I set up a working group, and we reorganised the documentation to eliminate repetition and therefore increase efficiency. The documentation is now in use, with the result that less mistakes are being made.

6. B3. Give examples of working as part of a successful team, highlighting your contribution to that success

As a team of 26 we must work together, communicating constantly, to complete the work each day. Samples are received in Sample Reception throughout the afternoon, are registered and distributed to different stations depending on the analysis required. The majority of the samples must be analysed the same afternoon. Staff are cross-trained across all methods, and so can rotate through all areas. Although we work independently on work stations, if complete we then move to assist elsewhere. Part of my role is to organise the team to ensure that staff are rotated throughout the lab, but also to put them where they need to be for training requirements. Often we need to react to a changing situation, depending on the workload and the urgency, and I will organise staff accordingly. We complete the work very much as a team. Problems are reported to me, such as broken equipment, failed AQC results, etc. The Analyst can then continue their task, and I take the necessary steps to resolve the issue.

In December 2021 there was an incident at a Treatment Works, and thousands of customers were without water. We were required to analyse a large number of samples for a range of tests continuously for several days, with very quick turnaround times. I worked with the Senior team to recruit volunteers from the team to work throughout the night, and then co-ordinate to ensure that all aspects of the work were covered, in addition to ensuring the routine work was completed. I also took a shift through the night, performing Cryptosporidium analysis and microscopy. I liaised with the Water Quality department ; discussing analysis requirements, expected turnaround times and reported results. The outcome was that the Water Quality department were able to lift the boiling water notice for customers quickly.

7. B4. Show how you plan work and demonstrate foresight in carrying out your responsibilities, using resources effectively

My team is responsible for ensuring the safety of the drinking water for the North-East of England and

Essex & Suffolk, and throughout the Covid-19 pandemic we were required to maintain the level of service that we offer.

Several members of the team were required to shield themselves, and there was a risk that the virus could spread through the team, and so we realised that we needed to establish a plan quickly in order to protect the resilience of the laboratory and ensure that we were able to maintain our service to the business and the public, without compromising quality.

I met with the other senior staff and we made the decision to divide our team into two completely separate sub teams. I worked with the Team Leaders to build the teams based on skills in order to ensure that each team had the ability to perform the necessary analysis. Each team was allocated a Team Leader and a Scientist, and a shift pattern was established so that the teams would be kept apart from each other. This would ensure that if one team was forced to isolate the other team would maintain analysis.

Once we began working within our sub teams I designed a daily planner for both teams to organise the staff and the workload. I risk assessed areas where transmission of the virus could occur, such as shared telephones and the microscope, and put measures in place to mitigate these risks. I ordered masks for the site, and kept that responsibility throughout the pandemic.

I communicated with the other team by email and telephone, and worked from home when I could to help the team who were in the lab; carrying out duties that could be done remotely such as checking reports (validation; outstanding analysis), and checking the temperature monitoring system.

I designed a planner for all commercial work as it became difficult to liaise between sub-teams and the commercial team, and the planning was becoming too time consuming. The planner has since been adopted by the customer team.

I continued to train and method witness junior members of the team in order to help our situation.

The plan we made was effective: we were able to successfully maintain our level of service to the business and the public.

8. B5. Explain how you exert influence in your role and demonstrate good leadership, either directly or through networks

Throughout my career there have been many instances where I have exerted influence and lead my team. I have referred to several examples previously in my application, such as when the Cryptosporidium and Microbiology teams merged, and I suggested that we move the Cryptosporidium method into the main Microbiology lab. I recognised that this would improve efficiency as it would allow individuals to see which areas required more assistance. I discussed the idea with the other senior team members, and we agreed that it would alleviate pockets of pressure throughout the workload. The change required movement of large incubators from the main laboratory into the Crypto laboratory in order to make room for the Crypto equipment. Along with the senior team I identified which equipment needed to be moved; measured the benches to organise the space; arranged for the vacuum system to be moved into the main laboratory; and planned how and when the move would happen. In addition to alleviating the workload pressure this initiative was a success because it enabled the team to merge together physically and therefore accelerated the successful development of one large team.

In 2017 I was chosen to be mentor to an Apprentice within my team. This was a new initiative for the Scientific Services department, and there was very little guidance from the college, which meant that it was my responsibility to the apprentice and to the business to find what the apprentice needed to achieve over the next 2 years in order to be successful, and ensure that the resource was available for him to be able to achieve that outcome. Over a period of 2 years I met with the Apprentice regularly to assess progress against the criteria we had set out. I ensured that they received the correct level of training and support to equip them with the required level of knowledge, skill and experience. I organised the End Point Assessment and spent time with the apprentice, revising and discussing answers to possible questions. I qualified as a Registered Assessor, as required, and facilitated the End Point Assessment and ensured that it was conducted professionally. The overall outcome for the Apprentice was 'Distinction', and has since been appointed as an Analyst within my team.

During the Covid-19 pandemic my team was divided into two distinct sub-teams, each occupying the laboratory at separate times in order increase resilience within the team in the event that a team was

required to isolate. The usual practice for organising our commercial workload would be for individual members of the Commercial Team to contact the senior team by telephone or email to co-ordinate work. This arrangement became impossible to manage whilst we were working as sub teams because every team member in the lab was working at the bench at all times. The team members working at home couldn't respond to the requests because they didn't have access to the information about work already planned. I used Excel to develop a planner to record all commercial work online, and gave access to both the senior team and the commercial team. I applied limits so that the commercial team knew how much work we could accept without needing to contact the laboratory team. The planner was a success, and has now been permanently adopted by the commercial team.

9. C1. Describe how you communicate effectively with specialist and non-specialist audiences.

The microbiology laboratory attracts many visitors from a variety of avenues, and I regularly conduct tours for visitors; adapting the content of my tour accordingly. I always find out how much a visitor knows about our subject in order to help me to pitch the tour at a level which will make the tour worthwhile for them, and encourage questions.

I recently conducted tours for several interviewees. The candidates had applied for a position within my team, and had varying degrees of laboratory experience. I was able to discuss the microbiological aspects of the work in detail as I had ascertained from our conversation the level of knowledge they had. In response to their questions I also discussed with them the dynamics of the team and topics such as how our team fits in with the wider business.

My department recently offered a STEM opportunity to 15 secondary school students. I met with the senior team and we planned the 2 day schedule. As the students were aged 14-15 years we decided to make their experience as practical as possible in order to keep them engaged. I showed the students bacterial colonies on different types of media, and images of the same bacteria under an electron microscope. I demonstrated the streak plate technique and assisted them in performing the same technique. I then incubated the agar plates overnight and we examined the cultures together the following day. I also showed them how to look for *Cryptosporidium* under the microscope. I used short videos that I'd found to keep the students interested. The students asked many questions, and the feedback from the visit was positive, with a few areas for improvement identified.

10. D1. Explain how you promote, implement and take responsibility for health, safety and environmental issues and adhere to requirements relevant to your role

Our company has a strong Health & Safety culture, with the most recent campaign being 'Everyone Home Safe Every Day', for which everyone attended awareness sessions. Within our teams Health & Safety is given priority. In accordance with HASWA we have in place risk assessments, COSHH assessments, accident reporting systems, Personal Protective Equipment, and for the last three years I have ensured that our Employer's Certificate of Liability Insurance has been displayed, in accordance with the law. We ensure that Health, Safety & the Environment is first on the list at all meetings, and invite everyone to share any safety issues or concerns at the beginning of every meeting.

Every employee is responsible for reporting any health & safety issue immediately. In my routine work I must adhere to any safety measures identified through risk assessment & COSHH, and also carry out dynamic risk assessments. I take action on any issues which I identify myself, or which have been reported to me. This could be immediate remedial action, or it may be a procedural change.

There are two Health & Safety Reps within our team who are responsible for ensuring risk assessments are current and that PAT testing is up to date. I ensure that I organise time for the reps to work on these responsibilities. I support them by raising facilities requests, continuously risk assessing, formally briefing the team when necessary, and considering issues at Senior Team meetings. We also have a waste co-ordinator who ensures that all waste is disposed of appropriately.

Health & Safety is at the forefront of everything I do.

11. D2. Describe your contribution to key tasks, understanding fully the biological science objectives of the work done and its relevance to your employer and others

Within our laboratory we analyse drinking water samples as well as samples for pharmaceutical companies, environmental companies and building management companies, and also samples from the leisure industry. The tests we perform are to identify micro-organisms in the water which are indicative of faecal contamination. We perform extensive Quality Control processes alongside all real samples in accordance with the international standard ISO 17025, and this ensures that the results we produce are accurate. It is my responsibility to maintain, monitor, and improve this rigorous QC system. The laboratory is audited on a regular basis by the Accreditation Team, and also annually by UKAS (United Kingdom Accreditation Service) which confirms that our laboratory demonstrates competence and impartiality. As part of the Senior team I am heavily involved in these audits. It is vital that I am thorough with all areas of my work as this will be scrutinised by auditors.

By fulfilling my responsibilities in this task my team can provide a service to the business with a focus on regulatory and operational requirements. My company's main business is the collection, treatment and supply of drinking water, and the collection, treatment and disposal of waste waters and sludge. As such we are required to provide safe drinking water that is acceptable to consumers and that it meets the standards set down in law. Certain events can cause contamination of the drinking water, and it's important that this is identified as quickly as possible. Samples which fail are reported quickly to Water Quality, who act accordingly to protect public health. It is essential that the results we report are accurate in order to protect public health, but also because the actions that follow can be costly to the business. I am proud of our reputation for providing a high quality service to both the business and the public.

12. D3. Describe how you show professional integrity and respect for confidentiality, and where you comply with personal and professional issues such as ethical code of practice and the RSB Code of Ethical and Professional Conduct

I carry out several appraisals for Analysts within my team. I always treat confidential matters with the utmost respect. One of our company values is 'Ethical', and as a Values Champion it is my responsibility to promote this value within my team. I do this by setting an example in my own behaviour, and also by challenging the behaviour of others if necessary.

I am also Chair of Governors at a primary school where I am entrusted with sensitive information. I attend many meetings including Staffing & Finance, Curriculum, Safeguarding, School Admissions (including Appeals) as well as carrying out the Head Teacher's Performance Management Review on an annual basis. I am the Safeguarding governor lead, and audit the Single Central Register regularly. In accordance with the school's policy I am the point of contact for parent's who wish to lodge a formal complaint against the school. As such, I am privy to a great deal of information which must be kept confidential. I have held this position of trust for eight years, having been re-elected on an annual basis. I am also a parent with a child at this school, and so I am always careful to keep school business entirely separate from my parental association with school.

In both my Scientist role at work, and my School Governor role I treat any information I have with respect. I have undertaken several GDPR training courses and always ensure that I am compliant. My conduct is scrutinised formally at every appraisal.