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A: APPLICATION OF KNOWLEDGE AND UNDERSTANDING

A1: Apply extended knowledge of underlying concepts and principles associated with area of work. *We are looking for an example of how you have used your extended knowledge within the area in which you work. This will include developments within your field and the ability to understand and apply new developments to your area of work.*	As the School of Clinical & Experimental Science (CES) Radiation Protection Supervisor (RPS) I am responsible for adapting the University's Environment Agency (EA) permit for the use of radiation in research into a set of 'Local Rules', agreed by the Head of School. This includes radiation risk assessment, health and safety standards and inspection, radiation safety induction and contingency planning; in order to enforce the EA permit and Health & Safety Executive (HSE) UK government legislation; for which the school is audited by the EA annually. I am responsible for competency training and evaluating staff and students in laboratory techniques, so must ensure that my training workshops include the most up to date information. I also perform health and safety, and containment level 1 and 2 laboratory inductions for all laboratory staff and students. For my role as RPS, I must be up to date with Environmental Permitting Regulation (ERP legislation) and the Ionising Radiation Regulations (IRR legislation) and the methods by which radiation users can remain compliant with these rules, so I may train radiation users within CES accordingly. I must also have a sound understanding of the different types of radiation (alpha, beta and gamma) and the sources used within the university; and understand the behaviour of this radiation

	to assess shielding requirements and calculate dose rates to avoid any overexposure and possible health implications to radiation users. The workshops that I devise and run for staff and students are currently: pipetting technique, tissue pulverisation under liquid nitrogen, DNA/RNA extraction from tissues/cells, cDNA synthesis and quality control, principles of PCR and primer design, qPCR and analysis, DNA/RNA electrophoresis and interpretation of results, primer and probe optimisation, DNA gel excision, purification and preparation of samples for Sanger sequencing, and interpretation of Sanger sequencing results. I must regularly review acceptable experimental design for publishing and how best to validate data. I must also continually investigate the most appropriate reagents to use for particular tissue/cells and new and developing methods, so that I am training those that attend my workshops in the most optimal methods available to the school. I attend external and internal training courses, e.g., Fisher Scientific Principles of qPCR, Illumina Next Generation Sequencing training. I liaise with suppliers to learn what their latest applicable products are, run optimisation experiments to compare products with different tissues in order to establish whether yield and quality can be increased in order to improve downstream analysis – thus creating more robust and replicable data. To support induction of staff and students, I attend regular refresher training for First Aid at Work, Fire Warden Training, and First Aid for Mental Health (FAMH)

	Training. I also regularly review and adapt laboratory induction policies for working at containment levels 1 and 2 to keep these current with the University Safety Office guidance. I attend 3-yearly refresher training delivered by the University [redacted] Health & Safety Manager for Radiation (HSM-R) for research utilising open-source radiation, and radiation protection supervision (RPS Refresher Training). I also run and deliver annual radiation contingency training for researchers involved in work using radiation to update them on safe working practices according to the latest government permits held by the University.
A2: Review, evaluate and apply underlying scientific concepts, principles and techniques in the context of new and different areas of work. *What we are looking for here is how you have taken techniques/principles and reviewed, evaluated and applied them in a new area of work.*	In my research into mitochondrial dysfunction in cardiac myocytes in the metabolic disorder, I decided to assess whether a high fat diet and an obese phenotype of mouse dams during pregnancy leads to a decrease in function of mitochondria in adult offspring; increasing the propensity of metabolic disorder in offspring of obese mothers. Most functional mitochondrial experiments are performed on cultured cells, as it is much easier to keep mitochondria functionally alive in culture than measuring in vivo, or on freshly isolated mitochondria. These organelles are very difficult to keep alive and functioning outside of the cell. In order to try and increase the in vivo applicability of my mitochondrial function experiments, I undertook a project to try and isolate functional mitochondria from

	freshly dissected mouse cardiac tissue and measure the oxygen consumption on a Seahorse Real-Time Metabolic Analyser. I dissected mouse heart tissue from freshly culled mice, and immediately isolated the mitochondria in the first instance using subcellular fractionation by density gradient centrifugation of cardiac tissue homogenate, which is a well-established method for mitochondrial isolation from tissue. Unfortunately, a large proportion of the isolated mitochondria did not survive the protocol with a suitable level of functionality or purity that could be accurately measured using the Seahorse Analyser. I therefore consulted the most recent scientific literature where research was beginning to be undertaken using high-resolution methods, such as real-time metabolic analysis. I learned from this literature that extraction of functional mitochondria from dissected tissue could be achieved using Magnetic-Activated Cell Sorting (MACS) Technology, developed by Miltenyi Biotec. This technology is based on the use of mono-clonal antibodies designed to be specific to the cell-type or membrane-bound organelle of interest. This method includes lysing cells and magnetically labelling the outer mitochondrial membrane using Anti-TOM22 microbeads, which specifically binds to the translocase of the outer mitochondrial membrane of mouse mitochondria. The labelled lysate is then passed through a column subjected to a magnetic field, which pulls the still-functional mitochondria out of suspension and allows them to be very quickly isolated and subjected to downstream analysis.

	The increased speed and simplicity of this method allowed me to isolate functional mitochondria from mouse cardiac tissue, for which I went on to successfully analyse oxygen consumption. I was able to conclude that obesity in pregnant mice is linked to mitochondrial metabolic dysfunction in the cardiac tissue of adult offspring. I went on to validate these results using electron transport chain (ETC) enzyme activity ELISA assays to show that functionality of components of the ETC are compromised in the offspring of mice that were carried by obese mothers during pregnancy.
A3: Analyse, interpret and evaluate data, concepts and ideas to propose solutions to problems. *We are looking for an example of how you observe and interpret the results from your data to draw conclusions and inform your next steps.*	A researcher was having issues replicating differences in gene expression between animals of different experimental dietary groups that were significant in previous experiments. This researcher asked me to troubleshoot their experiment to see where reproducibility had been lost. I have considerable expertise in using quantitative polymerase chain reaction (qPCR) to measure gene expression in animal tissue. This is usually to compare experimental groups of animals that have been subjected to differing environmental stimulus during pregnancy or lactation. Gene expression can be measured by dissecting the tissue of interest from the culled animal, and extracting the total RNA contained within the tissue; this can be achieved by homogenisation of the tissue and lysis of cells to release RNA, which can then be isolated. From the isolated RNA, a complementary DNA (cDNA) template must be synthesised using reverse transcriptase, an RNA-directed DNA

	transcriptase enzyme. A cDNA template is required for qPCR in order that Taq DNA polymerase (a DNA-directed DNA polymerase) may amplify the quantity of the cDNA of interest, to allow levels of expression to be measured in real-time through successive rounds of thermal cycling. By synthesising short sections of DNA oligonucleotides, called primers, a specific gene of interest may be picked out for amplification by Taq DNA polymerase. During each cycle of DNA replication, a quantum of light is released from each double-stranded molecule of DNA (dsDNA) present in the sample. This quantum of light is recorded by the qPCR instrument and is directly proportional to the amount of dsDNA present in the sample. As the primers (which are identified by the Taq DNA polymerase as the site to replicate) are specifically designed for a region of the gene of interest, the intensity of light measured is directly proportional to the level of expression of that gene in the original tissue. The intensity of light is plotted against cycle number, and an intensity 'threshold' set, usually the beginning of the exponential phase of the plot where the intensity of light doubles with each replication cycle. The cycle number where light intensity reaches threshold is recorded as the 'Ct value', which is used for downstream analysis. The earlier the sample reaches threshold (i.e., the lower the Ct value), the higher the expression of the gene of interest. In a previous qPCR run (experiment 1), there had been a significant increase in expression of a gene of interest in mice that were subjected to a high fat diet,

	compared with mice that had been fed a control diet. Upon repeating the experiment (experiment 2), the significant difference between high fat and control groups had disappeared, and levels of mRNA for the gene of interest measured by qPCR, were no longer significantly different to that of the control group. I reviewed the qPCR raw data and statistical analysis for experiment 1 (significant) and experiment 2 (non-significant). I found that in experiment 1, the raw qPCR amplification plot showed that for the high fat dietary group, all replicates within that group reached threshold in a tight group between PCR cycles 10 and 11. For the control dietary group, all replicates reached threshold levels between cycles 16 and 17. From looking at this data, I can predict that this would ultimately show a significant difference in gene expression between the two groups upon analysis, which the researcher's statistical analysis confirmed. However, in experiment 2, the high fat dietary group replicates were reaching threshold levels around cycle 17, with control group still reaching threshold between cycles 16 and 17. From experience, I can predict that analysis will show that there would be no significant difference compared to controls; confirmed by the researcher's analysis of the data. With this evidence, I came to the conclusion that the issue may lie with the samples making up the high fat dietary group. I discussed with the researcher how the samples had been treated, and if there had been any differences in treatment or

	storage of the high fat group samples compared to the control samples between experiments. The researcher let me know that they had run out of cDNA for the high fat dietary group, so had synthesised a fresh batch. Therefore, experiment 1 used cDNA batch 1 for both dietary groups, then in experiment 2 the researcher used batch 2 cDNA for the high fat group, and batch 1 for the control group. I identified that the researcher had not used the same thermal cycler to synthesis batch 1 and batch 2 cDNA. In changing the thermal cycler between batches, the second machine had not allowed as efficient cDNA synthesis as the first, leading to less cDNA being present in the final high fat dietary group sample loaded into the PCR plate in experiment 2, compared to experiment 1. This led to a false result upon analysis. I advised the researcher to synthesise a fresh batch of cDNA for both dietary groups from the original isolated RNA samples, using the same thermal cycler for each dietary group, and run the qPCR again. Upon doing this, the significant differences between dietary groups were successfully replicated from the first experiment.

B: PERSONAL RESPONSIBILITY

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B1: Work autonomously while knowing when to escalate appropriately and recognising limits of scope of practice. *We are looking for an example of how you work with no supervision for certain key tasks, experiments or procedures associated with your role within required timeframes. You will also be able to demonstrate your understanding of when you need to seek input from either your supervisor or others and when to escalate.*	I was contacted by the School of Cancer Sciences with a request to validate single nucleotide polymorphisms (SNPs) identified by large-scale next generation sequencing (NGS), as part of a study to identify possible genetic mutations associated with disease phenotypes in human participants. I identified that the most appropriate method of validation would be to design primers flanking the SNP site identified by NGS on genomic DNA (gDNA), and amplify these sites using PCR. These amplicons must then be isolated and sequenced using Sanger sequencing methodology. I then interpreted the sequencing data and compiled a report detailing which SNPs were validated and which were not During the experimental design, I discussed with the customer what the cost of each aspect of the project would be, and how this compared to outsourcing the work to an external company. As my costings were considerably cheaper than outsourcing, the researcher chose to pass the project to me for validation. I independently selected the most appropriate method of validation for this project and was entirely responsible for the experimental design. I was provided with NGS sequencing data, which had identified possible SNPs in genes of interest (ATM, CHEK2, PALB2 and TP53) associated with disease phenotypes in participants. In 277 patient genomic DNA (gDNA) samples, 90 sequence variants (possible SNPs) were identified by NGS; 43 for ATM, 20 for CHEK2, 19 for PALB2 and 8 for TP53.

	For each variant, I designed primers to specifically bind to sites flanking the region of possible SNPs. To do this, I obtained the gDNA sequence for the gene of interest from Ensembl and identified appropriate primer binding sites using the Basic Local Alignment Search Tool (BLAST) primer design tool. I then performed a whole-genome alignment with the primer sequences to ensure that the primers were specific to my region of interest and would not produce non-specific product. In all, I designed and ordered 119 primers for this project, arranged into 64 primer sets. Primer set annealing temperatures were then optimised for samples using standard gradient PCR and agarose gel electrophoresis, to judge which annealing temperatures produce the highest quality PCR product (i.e., 'tight and bright' bands when visualised under UV light). Using the specific primers sets at optimal annealing temperatures, I used standard PCR to amplify the regions of interest for each patient sample. Then subjected the PCR products to DNA agarose gel electrophoresis and visualised the PCR product using GelRed nucleic acid stain under ultraviolet (UV) light. I would then ensure that the band is of the expected molecular weight by comparing the band size to a DNA reference ladder run alongside the products. Correct sized bands corresponding to the designed amplicon were then excised under UV light and purified using a gel and PCR clean up kit. The isolated PCR product and matching primer sets were then packaged and sent to Eurofins for Sanger sequencing.

	Upon sequencing completion, raw data would be sent to me, which I would visualise using FinchTV software. I would assess the quality of the sequencing traces produced for each amplicon (i.e., whether a high degree of background noise was present), and the sequences found. I then used this data to compile a report detailing whether sequencing had been successful (i.e., had produced sequencing traces of sufficient quality), what may have caused any samples to fail (e.g., poor gDNA quality sample, low yield of DNA from gel clean up, etc.), and most importantly whether the SNP identified by NGS was validated by Sanger sequencing. My compiled report was then passed back to the School of Cancer Sciences researcher, who then discussed the conclusions with their clinical team. Overall, 100% of control samples (using reference gDNA of consistently high quality used as a positive control) and 70% of study DNA was successfully sequenced. I found that this was due to inconsistencies in DNA sampling quality, and varying levels of degradation in the samples. As the validation process by Sanger sequencing is particularly expensive, the clinical team had to discuss whether it was financially worthwhile to their overall research study to have me further troubleshoot and repeat any failed low-quality samples. The group identified the most important targets for their hypothesis and chose those that would make the most research impact for me to troubleshoot and repeat. I investigated the samples that failed the first round of sequencing to establish why this may have occurred. I picked the samples that corresponded to the failed

	sequencing runs and that had been identified by the clinical study team as most important. I ran the gDNA on an agarose gel to confirm whether the samples had undergone significant degradation. I found that all selected sample gDNA produced a 'smear' upon electrophoresis, indicating that the sample had degraded; this was supported by the fact that the first round of PCR products for these samples had produced fainter bands than those that had been successfully sequenced. I troubleshooted that changing some PCR parameters may overcome this issue. I ran subsequent PCRs adjusting the amount of replication cycles (if the availability of replicable DNA is too low, this can lead to insufficient amplification for sequencing), increasing the extension time (this can aid complete replication of the target), and increasing the primer annealing time (allowing the primers increased time to bind to the template). In most cases, I was able to adjust the PCR parameters in order to gain a sufficient Sanger sequence to validate the NGS sequencing.
B2: Take responsibility for safe and sustainable working practices and contribute to their evaluation and improvement. *We are looking for an example of how you have taken responsibility for working safely and sustainably.*	I am responsible for incident investigation of health and safety incidents that occur in the labs for which I am responsible for managing. I am required to maintain continual professional development (CPD) in areas of health and safety associated with the area for which I am responsible for managing. As part of my role as CES Radiation Protection Supervisor (RPS), I oversee regular radiation contamination monitoring of designated radiation areas and run annual contingency training for radiation users.

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	If a health and safety incident or near-miss occurs within my labs, the Health & Safety Manager – Chemical (HSM-C) will contact me with an incident report and it is my responsibility to investigate what has occurred, and what safety measures can be taken to negate the risk of a similar incident happening again. I have undergone training and regular refresher training for nationally accredited, as well internally run and assessed University training courses, which allow me to generate and communicate local lab policies for the health & safety of lab users. I ensure that radiation users perform wipe tests and monitoring to indicate if the levels of ionising radiation and contamination are satisfactory for work to continue and to establish if the area is appropriately designated. I also devise and perform regular contingency training for radiation users to communicate the most up-to-date and appropriate health and safety information related to working with open sources of radiation. Upon receiving an incident report from the HSM-C, it is my responsibility to interview the person(s) involved and then discuss this with their principal investigator (PI). I will establish what occurred, whether the standard operating procedure (SOP) and RA was being followed and suggest measures that can be taken to prevent the incident occurring again. I then report my findings to the HSM-C for authorisation. For instance, I recently received report from the HSM-C describing an incident where a medical student received a slight burn to the hand as they were handling a

	Schott bottle of molten agar without safety gloves and had inverted the bottle to mix causing molten agar to leak out of the bottle onto their hand. I reviewed the manner in which the student had been trained, and the details of the SOP and the associated RA. I established that this lab user was not following the SOP and training they had received, which detailed that the molten agar must be swirled to mix, and the vessel must not be inverted due to the risk of leakage. The student was also not wearing thermally protective gloves, which during our interview they let me know were unwieldy and did not allow for sufficient dexterity, so had decided not to wear them. I discussed these findings with their PI and advised that thermally protective gloves with a greater degree of dexterity should be purchased, and the RA and SOP be adjusted to detail this. I also advised that the student be retrained in the procedure to emphasise all safety precautions listed in the RA and SOP review, and why these must be followed. I detailed my findings and recommendations to the HSM-C in the incident report and investigation form and returned this to the Safety Office for authorisation so that the incident could be closed. I hold accredited qualifications in First Aid at Work (Aid Training & Operations Ltd, cert No. 136019), Research Involving Human Tissue (NHS Health Research Authority), and FAA Level 3 Award in Supervising First Aid for Mental Health (Nuco Training, cert No. NCJ66453919). These qualifications inform 'Health & Fire Safety', and 'Working in Containment Level 2 Labs' inductions which I deliver to all staff and students using the labs on my floor so that I may grant them authorised personnel status and access to facilities for which I am responsible (this includes granting key code access to restricted areas). My First Aid and First Aid for Mental Health

	(FAMH) training allows me to deal with emergency situations where a person's wellbeing is at risk, and to take steps to provide short-term support until medical help is available. As a level 3 FAMH, I am qualified to supervise other first aiders for mental health, in order to co-ordinate mental health support throughout the Faculty of Medicine through regular contact meetings. Radiation users currently perform direct or wipe test monitoring of the designated supervised work area before and after their experiment, and weekly while experiments are in progress. This monitoring regime helps to establish the adequacy of current working procedures as safe, to detect breakdowns in engineering controls and any previously undetected accidental release. As monitoring must only be undertaken with in-date calibrated instruments, I also ensure that direct monitors (i.e., EL and EP15 monitors) and scintillation counters are regularly serviced and calibrated; I keep a log of instrument calibrations and any monitoring data for a minimum of two years, in line with the University of [redacted] Radiation & Contamination Monitoring Policy, written and maintained by the HSM-R. I also devise and run contingency training sessions where radiation users are trained to deal with unsealed radiation incidents, first aid incidents including minor or major injuries, radiochemical spillage, over-exposure to radiation, radiation incidents involving fire, and actions to take in the event of a lost or stolen source. I update this training annually using the University of [redacted] Contingency Arrangements Policy, written and maintained by the HSM-R, and disseminate any policy changes that may have occurred to end users.

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B3: Take responsibility for the quality of your work and also enable others to work to high standards. *This means that you can show how you are aware of the quality standards necessary for the work being carried out by you and others. You should be able to describe an example of how you enable these standards and ensure that they are applied.*	As Laboratory Technical Manager, it is my responsibility to write, review and ensure my team have read and signed control of substances hazardous to health (COSHH) forms, risk assessments (RAs), and standard operating procedures (SOPs). I found that many risk assessments and SOPs for common technical duties were being replicated across the dept for different labs. I combined these to produce overarching COSHH, RAs and SOPs to streamline the annual review process and ensure that all technical team members are given consistent training and safety guidelines. I then produced an online resource of Technical Team RAs and SOPs on SharePoint that can be accessed by all members of the technical team. I have compiled a database of overarching COSHH, RAs and SOPs to streamline the review process and ensure that all technical team members are given consistent training and safety guidelines. This has allowed me to devise competency training sessions to give a comprehensive induction to technical staff of how to undertake tasks such as centrifuge maintenance, cleaning and calibration of instruments, filling liquid nitrogen storage dewars, cylinder and regulator changing, use and maintenance of autoclaves, maintenance of light microscopes, cleaning and maintenance of CO2 incubators and laminar flow hoods for tissue or bacterial culture, calibration and in-house servicing of pipettes, use of the Agilent Bioanalyser 2100, etc. I run practical assessments as part of training sessions to ensure each trainee is competent, and to advise where improvements to technique are to be made;

	explaining why these changes must be made and the impact of poor technique. For instance, when centrifuge maintenance training, I assess whether the trainee can disassemble the centrifuge rota and seals, disinfect components, and then competently reconstruct the centrifuge to a good working standard. I then give feedback to the trainee, such as ensuring the aerosol O-ring seal is sufficiently pressed into the rota; as if it is allowed to pucker beneath the rota lid, the probability that the seal will escape and become entangled in the inner workings of the centrifuge chamber are increased, possibly leading to expensive damage and repair costs to the centrifuge.

C: INTERPERSONAL SKILLS

C1: Demonstrate effective and appropriate communication skills. *What we are looking for here is an example that you are an effective communicator. The example can be through appropriate oral, written or electronic means.*	As staff members of the University, we are strongly encouraged to hold individual appraisal discussions between staff and their line managers on an annual basis. Members of staff discuss their previous year's objectives and continual professional development (CPD) with their line manager, decide to what degree objectives have been met, and agree upon new objectives and CPD for the coming year. I hold annual appraisals and monthly one-to-ones with my member of staff. I also attend annual appraisals and one-to-ones with my line manager. For my appraisal, I must electronically submit my appraisal form to my line manager. This includes my percentage split of workload across operational

	excellence and innovation, supporting education, research, and enterprise, supporting the wider University, and leadership, management, and engagement. I must submit detailed SMART objectives from my previous review period and to what degree these objectives have been met (on a scale of 1: expectations not met, 2: expectations met in part, 3: expectations fully met, 4: expectations exceeded, 5: expectations significantly exceeded); this employee contribution rating is then used to prompt face-to-face appraisal discussion between myself and my line manager. During the appraisal meeting, we discuss CPD that I have been involved in over the previous review period, and how this has facilitated my job role. We also discuss and agree on CPD for the next review period, and how these would align with my future career aspirations. As line manager of senior and junior technicians, I am also experienced in conducting appraisals and personal performance and development reviews (PPDRs). My member of staff will submit their appraisal documents to me for review, which we then have an in-person meeting to discuss. Together, we confer as to what degree objectives have been met and how I can support my staff member to meet any incomplete objectives and agree upon new SMART objectives for the coming review period. We will also discuss their ongoing CPD in support of their career aspirations, coupled with the needs of the laboratories which I manage. I will then write a PPDR report, which I send to my staff member to review and sign, which is then submitted to human resources as a record of appraisal.

	In order for objectives to inform ongoing work for my member of staff, I use their agreed objectives as a basis for monthly one-to-one meetings. I use these meetings to facilitate completion of tasks, while ensuring that my staff receive support and/or training they require to complete objectives in a timely fashion.
C2: Demonstrate effective interpersonal and behavioural skills. *This means that you can give an example that demonstrates the skills that you use to interact with colleagues in a constructive way within the work setting. In these situations it may be appropriate to discuss these with your supervisor, as an external perspective is often very useful in this regard.*	I am responsible for induction of all staff and students into the C level labs, and ensuring all microbiological waste generated is disposed of safely in accordance with University Hospital [redacted] waste streams. I conduct individual Health & Safety Containment 2 Laboratory Inductions for all new starters. I also train members of each lab in the standard operating procedure of disposal of microbiological waste via the NHS Waste Management Service. For all new laboratory workers, I conduct an initial induction introducing fire safety for the floor, safety personnel (fire wardens, first aiders, first aiders for mental health), conduct within containment level 2 labs, procedures for equipment and laboratory use, security, and waste disposal. As the University [redacted] labs for which I am responsible are within an NHS Trust building, it is my responsibility to ensure my laboratory users follow NHS standard operating procedures for disposal of any waste that is hazardous to the environment or human health, so that it may be disposed of in accordance with UK government legislation.

	To achieve this, I hold individual training sessions to practically demonstrate the microbiological waste procedure. This requires safely contained removal of inactivated microbiological waste from the laboratories, safe transport through hospital areas that are accessible by other hospital staff and members of the public, to the NHS Microbiology Dept, who have the facilities to autoclave and dispose of potentially hazardous waste on a large scale. Personnel within the laboratory consist of principle investigators, professors, doctors, technicians, visiting scientists, clinical and postdoctoral researchers, postgraduate researchers, PhD students, undergraduate students, medical students, research assistants, and administrative staff. The workforce within the labs is diverse: culturally, socioeconomically, and educationally. I must therefore adapt my methods of communication effectively, whilst ensuring that all pertinent information is relayed and understood.
C3: Demonstrate productive working relationships and an ability to resolve problems. *This means that you should be able to describe how, when working with others, you are able to demonstrate that you developed positive working relationships and resolved the problem. Your*	Due to the lifting of COVID-19 restrictions in hospitality and other sectors during 2020/2021, the demand placed upon the production and distribution of carbon dioxide (CO2) gas increased to unsustainable levels, causing a worldwide shortage. The availability of CO2 for medical research therefore decreased and labs across the School were experiencing shortages that threatened ongoing research. Due to increased demand, the price of refilling CO2 cylinders also significantly increased. The long-standing procedure throughout the School has been that each individual floors' lab manager be responsible for maintaining their own CO2 stocks and holdings, without co-ordinating orders or deliveries between floors. This has

example should demonstrate how those working relationships were effective in resolving problems.	resulted in multiple, small-scale orders being processed, leading to inefficient duplication of work, and increased delivery costs and carbon footprint due to multiple delivery trips. In a technical team meeting with Laboratory Technical Managers across the School of CES, the team discussed that all floors (levels B, C, D, E and F) form a central database of CO2 holdings to be accessible by the whole team, in order to more efficiently co-ordinate School holdings and expenditure. As an action from this meeting, I constructed a central CO2 Holdings Database, which I placed on the CES Technical Team SharePoint site. All lab managers across the School have access to this database to take stock of their CO2 cylinder holdings, including cylinders in-use and any back-ups. This allows the team to combine what would have been multiple small CO2 orders for each floor into larger, more co-ordinated orders reducing delivery costs and decreasing our demands on the manufacturer. This also allows for more effective contingency measures by sharing current holdings in times of decreased availability.

D: PROFESSIONAL PRACTICE

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D1: Identify, review and select scientific techniques, procedures and methods to undertake tasks. *This means you can give an example of work that you have undertaken showing where and why the method/procedure used was chosen as the best (or most relevant) to use.*	As detailed in section B1, I was contacted by the School of Cancer Sciences with a request to validate single nucleotide polymorphisms (SNPs) identified by large-scale next generation sequencing (NGS), as part of a study to identify possible genetic mutations associated with disease phenotypes in human participants. To achieve this, I had to review the most appropriate method in terms of applicability, cost-effectiveness, and available facilities. As a result of this review, I decided that Sanger sequencing the NGS identified variants was the most appropriate method to use. NGS sequencing in this case has been used as a broad method to identify novel genetic variants in patients with disease phenotype in associated genes. NGS allows for millions of DNA fragments to be sequenced simultaneously and can detect multiple variant types. This is a high throughput method that generates huge amounts of data. Conversely, using the Sanger method, only one strand of DNA is sequenced at a time. According to scientific literature, Sanger sequencing has been the long-established "gold-standard" of NGS validation, owing to its effectiveness in identifying false positives/negatives with great accuracy (a recent study found that 942 out of 945 NGS sequences were validated by Sanger, and the three that found discrepancies could be validated after troubleshooting for allelic dropouts at the PCR stage: "Sanger Validation of High-Throughput Sequencing in Genetic Diagnosis: Still the Best Practice?" (Dec 2020) Frontiers in Genetics, 11, 1496).

	Sanger sequencing is a robust, quick, and simple protocol, which lends to effective troubleshooting of troublesome samples. For small scale sequencing projects, Sanger is cost-effective and time efficient in the production of high quality, trustworthy validation results.
D2: Contribute to the organisation of tasks and resources *This means that you can give examples of how you have contributed to the running of the laboratory/workshop/section or other types of working environment.*	As a small technical support team, spread across an entire School, a system is required to ensure there is no duplication of work and that all members of the team are made aware of what regular laboratory tasks are required and on what timescale. There are many technical tasks that must be kept up to date within laboratories and specific timescales for when these tasks must be completed. Often, regular tasks differ between laboratories within the same School, requiring co-ordination to ensure that essential tasks are completed as required. These tasks include specialist waste disposal, containment level-dependent housekeeping duties (e.g., regular laundering of lab coats for containment level 2 labs), running of autoclaves, emptying and disinfecting of tissue culture aspirators, top-up of general use cleaning products such as 70% ethanol and blue roll, calibration of pH meters, ordering of reagents for in-house servicing and calibration of the Nanodrop-1000 spectrophotometer, checking of CO2 cylinder levels, CO2 incubator calibration checks, centrifuge servicing and maintenance, microbiological safety cabinet and laminar flow hood servicing, among many others. These tasks also include monthly health & safety checklists (i.e., to ensure fire exits are clear of

	obstacles, flooring and walkways are in good repair, laboratory and corridor lighting is sufficient, etc.) I constructed a laminated checklist for each laboratory, split into groups of tasks by weekly, monthly, 3-monthly, 6-monthly, and annually. As multiple technicians work between the labs across the School, as tasks are completed and ticked off, this has allowed other technicians to know which jobs have already been completed and which jobs are yet to be done. This 'technical checklist' has reduced duplication of work, allowing for greater efficiency of the technical team. This has also allowed better co-ordination of tasks across labs and reduction of expenditure; for instance, calibration dates of the Nanodrop-1000 spectrophotometers in each lab have now been aligned, allowing the purchase of only one kit of calibration fluid (CF) for use on all units as once opened the CF must be used immediately.
D3: Participate in the design, development and implementation of solutions. *This means that you can give an example of 'problem solving' that describes your specific role in helping to overcome a specific problem. For instance it might mean that a process, programme, design, assay, or method suddenly stops working and you are involved in finding out the reason why.*	It was noted during an annual Faculty Safety Inspection that hazardous chemical waste requiring specialist disposal via the NHS Trust waste streams was accumulating in laboratory chemical storage areas, taking up valuable space within working labs and increasing the risk of accidental exposure due to knocking over or leakage of old vessels. There was no regular system by which laboratory users logged or made any technician aware of hazardous chemical waste to be disposed of; this led to large amounts of chemicals hazardous to health building up in labs, posing significant risk to lab users.

Your example should show what your role was in understanding the problem and what your contribution achieved.	In order to mitigate these risks as far as reasonably practicable, I implemented a communal Hazardous Chemical Waste Disposal Point and logging system to ensure harmful waste for disposal no longer accumulates in working laboratories, decreasing the likelihood of accident and injury to lab users. In order to remove excess chemicals from working labs and to simplify identification of waste, I designated a chemical storage cabinet in a communal Instrument Room as a Hazardous Chemical Waste Disposal Point. I have devised a standard operating procedure by which users log their waste on a disposal chart attached to the waste point, listing associated risk and hazard codes, the volume and number of vessels, and their contact details. On a monthly basis, I transfer the waste logs to the [redacted] NHS Waste Management Team. I then appropriately seal and package the chemicals, and transfer to the NHS Hazardous Waste Store for specialist onward disposal. This system has successfully reduced the accumulation of hazardous waste, allaying risk to lab users.
D4: Contribute to continuous process improvement. *This means that you can give an example which shows how you are aware of progress in your area and seek ways of improving the efficiency of your*	Continuous Professional Development (CPD) courses can be costly to attend; with cuts made to School training budgets, a solution is required to ensure all appropriate staff receive training, with the minimal financial impact possible. I have been in discussion with the Lead Technical Laboratory Manager (my direct line manager and overall technical manager within the School of CES) to create in-

work. It should describe how you seek to discuss with your supervisor the strategy for achieving this. For instance this could include new and improved methods, new ways to increase throughput, or ways to increase cost-effectiveness.	house technical training workshops to disseminate training from external providers across the technical team. I have been enrolled on an external HeaTED training course for transporting and using gas cylinders safely within universities; this is to be funded by the Faculty training budget held by the Faculty Technical Manager for distribution across the entire Faculty of Medicine (four Schools in total). As the CES share of this budget is relatively small, my manager and I have been discussing ways in which we can increase cost-effectiveness whilst maintaining high standards of health and safety training within the team. I have agreement from my manager that upon attending the external training course, I subsequently construct a training workshop based on the learning outcomes of this training, including correct identification of gas cylinders, how cylinders operate, associated asphyxiation hazards, oxygen enrichment, flammability hazards, correct gas-control equipment, key stages in safe cylinder usage, hazards associated with cylinder transportation, safe storage, and the introduction of safe working practices to the working environment. This way all members of the technical team in CES will receive appropriate training to remain compliant with current health and safety guidance, at a significantly reduced cost to the Faculty.

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E: PROFESSIONAL STANDARDS

E1: Comply with and promote relevant codes of conduct and practice. *This means that you can give an example of how you comply with a code of conduct (e.g. of your professional Body) or how you work within and promote all relevant legislative, regulatory and local requirements.*	As a member of the Institute of Science & Technology, I am required to reflect their Code of Professional Conduct. For example, point 3 of the IST Professional Code of Conduct is "must perform their duties and work activities in such a way as to safeguard the health and safety of themselves, their colleagues and must at all times have regard to the public interest". I take professional responsibility for health & safety induction of staff and students into the laboratories on the floor which I manage. I must keep the information contained within the induction relevant and up to date by attending CPD training courses, including Fire Warden, first aid, first aid for mental health, and risk assessment and COSHH training. I have devised an online/in-person hybrid induction itinerary to complement current COVID-19 related room capacity restrictions so as to reduce the risk of transmission of the virus in the workplace as far as reasonably practicable in accordance with UK government and University guidelines, to protect members of the University, [redacted], and ultimately to mitigate transmission to the public. The online component of the Health & Safety Induction includes instructional training videos to introduce good pipetting technique, proper use of microbiological

	safety cabinets, and microbiological lab safety. I provide links to health & safety e-learning and the H&S training SharePoint site, occupational health, and a list of current first aiders and first aiders for mental health. The in-person component comprises of a tour of the level C labs, all available fire exits, the designated fire muster point, introduction to safety personnel such as fire wardens, local first aiders and first aiders for mental health. I also explain the lone working procedure, hazardous chemical and microbiological waste disposal procedures, contractor control permits, emergency contacts and procedures, the fire panel, evacuation procedure and explain the UHS fire alarm system. Once inducted, the new starter acknowledges points discussed by signing and dating their induction checklist. I store signed induction checklists as a record of health & safety induction, which can be accessed by safety personnel on request in accordance with GDPR requirements. Upon induction, personnel are provided with access codes to the floor, lab keys and added to the level C laboratory Authorised User list.
E2: Maintain and enhance competence in own area of practice through professional development activity. *This means that you undertake activities to enhance your competence in your own area of practice i.e. Continuing Professional Development*	I must keep up to date with relevant training to enable the continuation of compliance of my areas of responsibility with UK government legislation, University Health & Safety policies, and to implement more sustainable and environmentally considerate laboratory practice. I am enrolled on CPD courses (University and external) over the next 12 months to enhance my areas of expertise in health and safety, radiation protection, safe

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(CPD) and reflect on its impact on you and others. We are not looking for a list of courses here but evidence of how your CPD benefits your practice and benefits others. Your CPD may include work-based learning, professional activity, formal/educational, self-directed learning. *(Note registrants will need to comply with the Science Council CPD Standards)*	transport and use of gas cylinders, and an introduction to the Laboratory Efficiency Assessment Framework (LEAF). The following is a list of my planned CPD over the next 12 months I am enrolled on six CPD courses, below reviews the benefits to my practice and the associated impact on others. Radiation Protection Supervisor Refresher Training (March 2022, 3 day course, University Health & Safety Manager – Radiation, HSM-R): I have been a qualified RPS since 2012; regular refresher training allows me to hone my skills and knowledge, whilst keeping me updated of any legislative changes that must be implemented to the Radiation Local Rules, allowing radiation users in my area of supervision to remain compliant with current UK Government legislation, and maintain safe working practices for individual users, the University, the public, and the environment. Fire Warden Refresher Training (March 2022, 1 day course, University Health & Safety Manager – Fire, HSM-F): I have acted as a Faculty of Medicine Fire Warden since 2012. By attending this refresher course, I am able to incorporate the learning outcomes into my Health & Safety Induction of new staff and students; also to ensure proper fire safety protocols are followed in the event of an emergency. First Aid at Work Refresher Training (Dec 2021, 2 day course, University of [redacted] Security): I have been a qualified first aider since 2012. By attending the refresher training, I am able to stay up to date with current policy including safely

	tending to casualties whilst preventing possible transmission of COVID-19, and practice my first aid skills in the event of an emergency situation. This allows me to provide an essential health and safety service to colleagues and students. Transport of Gas Cylinders (eLearning, 1 hour, HeaTED), Using Gas Cylinders Safely within Universities (eLearning, 3 hours, HeaTED): these external courses are to ensure that I am working with cylinders in a safe and effective way. This will inform the creation of a cylinder use training workshop for dissemination of the course outcomes to my team. LEAF implementation workshop (implementation workshop, half day, local LEAF facilitator): as the University of [redacted] has joined the Laboratory Efficiency Assessment Framework (LEAF), the initiative is to be rolled out across University Faculties to work toward the bronze accreditation level. Attending this workshop as the School of CES representative will allow me to advise and work with the rest of the School to devise and implement new and more environmentally-conscious systems of working.