Chapter 5

Demonstrating

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INTRODUCTION

The development of students' skills of enquiry through practical and field classes is characteristic of a wide range of subjects, most notably in the physical and biological sciences, in engineering, and in some of the social sciences. Traditionally such practicals provide settings in which students can come to see how knowledge within a subject has been derived from experiment and application, whilst examining the interconnections between theory and practice. At the same time, while deepening understanding of the scientific method as it applies in their subject, students develop the organisational, manipulative and observational skills which are part and parcel of the conduct of experiments, projects and practicals. Last but by no means least these practical activities also help to inculcate appropriate professional attitudes.

Postgraduate demonstrators are not of course solely responsible for what and how students learn in these laboratory and field classes, since they are part of a team whose various members also include lecturers, tutors and technicians. Whether in the laboratory or the field, however, demonstrators tend to be in the front line of teaching and learning: it is with them that the majority of students are likely to have the most direct contact during practical work. And since most demonstrators will be closer in age to undergraduates than the more established members of the teaching staff, students tend to see them as closer to their own culture and hence easier to approach. Indeed, as a familiar presence, ready and able to lend their assistance, demonstrators guide students through the various stages of setting up, working through, recording and analysing the results of experiments, field trials and surveys. Their potential impact on the quality of students' learning is therefore profound. They can, for example, help students broaden their range of practical skills, encourage them to tackle problems and difficulties confidently and clear-sightedly, and prompt them towards a firmer and more rounded understanding of the subject-matter of the course.

For the demonstrator too, the experience of teaching practical classes brings tangible benefits. Through their teaching, they too can enhance their understanding of their subject, while simultaneously developing the teaching skills of communication, support and guidance as they attend to those students who need their assistance. These are valuable transferable skills relevant to a wide range of employment opportunities both within and outside higher education.

This chapter focuses on practical ways of helping demonstrators approach their task with confidence. The chapter begins with an outline of the purposes laboratory and field classes serve. Next it reviews the principal aspects of the demonstrator's role: preparation; what is involved in running a practical class (including how to ensure the demonstrator's expertise can best be used to benefit student learning) and other tasks demonstrators may be asked to undertake such as the marking of field or laboratory reports. The special responsibilities involved in running field classes are outlined and a number of common concerns that demonstrators have to handle are reviewed. Throughout, appropriate cross references are made to other chapters in the handbook which contain material of value to demonstrators as well as tutors.

> *You have succeeded academically as a student and now, as a demonstrator, you can help others to succeed. Cast your mind back to the demonstrators who assisted in your undergraduate practicals: which of these stood out for you as particularly effective – and what was it, do you think, that made them so effective?*

Aims of Practicals

Learning aims are statements of general intent which indicate to students and teachers alike the general direction of the learning that is to be achieved in a course or part of a course. Thus, the general aim for practical classes is to enhance students' understanding of methods of scientific enquiry. This is pursued in a variety of well-established ways: for example, by giving students opportunities to undertake experiments, tackle problem-solving exercises, and carry out survey and project work, so that they can experience at first hand how the theory and principles of a discipline are applied. Yet while this general aim underpins virtually all undergraduate learning in the laboratory and in the field, it contains within it a number of more focused learning aims. These are summarised in *figure 1.*

KEY LEARNING AIMS IN PRACTICALS

- Consolidating subject knowledge;
- Introducing discipline-specific methods and procedures;
- Developing technical skills;
- Enhancing cognitive skills;
- Promoting teamwork skills;
- Increasing motivation.

Collectively, pursuit of these aims helps students appreciate both the method of scientific enquiry and professional attitudes appropriate to a given subject.

Figure 1

Consolidating Subject Knowledge

Consolidation is crucial since scientific knowledge in general and in most specific disciplines can be highly complex and abstract. Illustrating principles through concrete or simplified examples can be very helpful to students in illuminating core subject matter. Consolidating students' knowledge may be achieved for example by: illustrating material taught in lectures; simulating conditions in research and development laboratories; developing skills in communicating technical concepts and solutions; teaching theoretical material not included in lectures.

Introducing Disciplinary Methods and Procedures

Giving hands-on experience helps students appreciate the methods and ethos of practitioners in a discipline and thus contributes to the shaping of professional attitudes. Ways in which this may be done include: providing motivation to acquire specific knowledge; stimulating independent thinking; maintaining and deepening interest in the subject; teaching the principles of experimental work in the subject; showing the use of labs as a process of discovery.

Developing Technical Skills

Laboratory and field classes can provide frequent opportunities for students to learn how to use scientific equipment. This enables students to develop their technical, observational and motor skills, for example by: familiarising students with apparatus and measurement techniques; teaching basic practical skills; training students in observation; training students in keeping a day-to-day laboratory diary; training students in writing reports on experiments.

Developing Cognitive Skills

Carrying out experiments and projects can promote a range of cognitive skills involved in problem formulation and analysis, in classifying data, and in explaining results and predicting responses. Enhancing cognitive skills can be achieved for example by: training students in aspects of experimental design; teaching students to make deductions from measurements and to interpret experimental data; developing skills in problem solving; using experimental data to solve specific problems; fostering critical awareness by avoiding systematic errors.

Promoting Teamwork Skills

Practical exercises and experiments are often conducted in groups, where students can learn collaboratively. This method of working can lead to an appreciation of the value of working with others and insight into the skills needed for doing this effectively. Cooperative activities which can help to promote students' teamwork skills include: designing experiments; setting up experimental equipment; checking observations; sharing of possible interpretations from results; compiling group reports.

Increasing Motivation

The exchange of ideas inherent in working with other students can lead to a greater motivation towards and interest in the subject.

Demonstrators will normally be provided with statements of the particular learning aims of the courses on which they teach. It is essential that they become familiar with these – and especially the ones that apply directly to practicals – if they are to be in a position to offer focused and constructive support to students. For example, weak students may fail to see the particular point of an exercise they are undertaking, and the demonstrator can clarify this for them. Moreover, since practical tasks often contribute to a number of aims simultaneously, it can be useful for a demonstrator to be in a position to help students see the full range of ways in which a given exercise is potentially helpful. For example, during a field work survey students could be developing the specific technical skills of measurement and observation, whilst also learning how to work effectively in a group setting.

Take one practical course on which you will teach; looking through the list of aims above, which do you think will be most important for your course?

Against this essential backdrop of learning aims, we can now turn to consideration of what is involved for the demonstrator in preparing for and conducting classes in the laboratory or in the field.

GROUNDWORK

Learning Objectives and Tasks

Within any given practical or field exercise, the students' learning is usually focused on a particular objective or outcome. *Figure 2* shows one example for a particular practical class.

The learning objectives, set and specified for each session, relate to the wider, overall learning aims for a course or a term. As a demonstrator, it is essential that you have a clear understanding of the learning objectives for each session so that these can be communicated to the students and the activities for the class (see for example *figure 3*) can be appropriately planned and pursued. Many of the skills learned during activities related to such objectives are transferable between disciplines. It is therefore helpful to point out to students that the skills they are developing in their practical work will be invaluable regardless of the discipline they finally specialise in.

It is important nevertheless that students fulfil the particular objectives set for them, and thorough planning and preparation can help to ensure that both students and staff leave the class at the end of the session with a sense of a job well done. You should therefore make the most of opportunities to

INSTRUCTIONS FOR A SINGLE CONCEPT EXPERIMENT[1]

Using a Cathode Ray Oscilloscope

The objectives of this experiment are to make you familiar with the controls of a simple cathode ray oscilloscope (CRO) so that you will be able to:

- i Adjust a CRO to obtain a stable picture of an input waveform.
- ii Predict the effect of changing any one of the controls.
- iii Make measurements of the voltage and period of an input periodic waveform.

All these to be done using a Telequipment S51E cathode ray oscilloscope.

The cathode ray oscilloscope is probably the most used single piece of equipment in any scientific laboratory. Many different types and makes will be met during your course throughout the University. This experiment uses one of the simplest CROs available so that you may become familiar with its controls before passing on to more complicated types.

The programmed script includes an explanation of the function and operating principles of the CRO and takes you through the setting up and use of the instrument stage by stage.

Figure 2

TYPICAL INVESTIGATIONS UNDERTAKEN BY FIRST-YEAR STUDENTS IN AN INVESTIGATION LABORATORY IN BIOLOGY[2]

- How many bacteria exist in pasteurized and unpasteurized milk samples of different ages?
- How does temperature affect the growth of a yeast population?
- Can the alcohol content of fermented honey be increased by adding various mineral salts during fermentation?
- How effective are mouthwashes in killing bacteria in the mouth?
- What is the level of sewage pollution in Logan Creek as measured by fecal coliform populations?
- In what kinds of fruit juices do yeast cells grow best?
- What are the effects of household disinfectants on bacteria?

Figure 3

attend pre-class briefings where the learning objectives, content, level and potential pitfalls are discussed.

Your Role in the Teaching Process

This last point is a timely reminder that you will not be working in isolation: you are part of a teaching team which will encompass a wide range of experience, and which can therefore help you with various aspects of practical work. The team needs to work at working together, and needless to say, communication between everyone involved is vital. You will each have different roles to play and tasks to do, so make sure that you know who is doing what - communicate, don't duplicate. Precise responsibilities will however vary from one department to another and even from class to class. You may wish to consult with the course leader or your mentor if you have one, to find out about established ways of working in the department. Ensure that you know what the staff member in charge expects of you. Introduce yourself to the laboratory technical staff and find out about laboratory procedures.

The demands made on you as a demonstrator may vary considerably. At one extreme you may be present to assist students and answer queries without having been involved with the setting up of the practical; you may have neither continuity from one practical to another nor a longer-term commitment. At the other end of the spectrum you may be in sole charge of a group of students, ensuring that all equipment is available and working as well as being responsible for marking assessed work and giving written and oral feedback to students in your group. Some demonstrators may be responsible for the provision of equipment and ensuring that technical staff are present to run it. Other responsibilities may include the distribution of handouts, the supply of consumables prior to the practical classes, and the distribution to students of specimen answers.

As a demonstrator you are one of the most valuable resources available to students, but they may need advice and in some cases encouragement if they are to gain maximum benefit from their interactions with you. Conveying what your expectations are of a class (and what your role in the session will be) can go a long way to avoiding misunderstandings or frustrations. It also helps if you keep in mind the wider context of a particular practical or set of practicals, so that you can forge links into the lectures and tutorials which go to make up the course.

Perhaps now is a good moment to review how clear you are about your role in the course team. On what aspects of that role would you welcome further information and guidance?

THE PRACTICAL OR FIELD CLASS

Preparation

Attending briefing meetings, familiarising yourself with laboratory or other practical settings and reading all the course documentation are sound starting points for any practical or field demonstrating. Once this has been done, organising equipment and the students' activities can then be your priority. If you are in charge of the practical class or field trip you must ensure that any necessary equipment is in place and working and that, for example, the necessary reagents are available. Ideally, you should have done the experiment or exercise so that you are aware of its specific demands. In any event, before the class, you should spend time working through the instructions and trying to anticipate where problems are likely to arise. Drawing up a plan for each session will also give you confidence to approach the task and organise the various stages. This will often involve thinking through each stage and reviewing what you want the students to have achieved, how long it is likely to take them and what will be required of you. This helps to get a good impression of how to deploy the time available for the class to greatest effect. It should of course be an objective that all students complete the work set, though in some cases this may not be feasible.

Students understandably expect clear guidelines on what is required of them and your verbal instructions should be backed up with a detailed written explanation of the work to be done. If this is not already in the laboratory guide or course book, you may find it worthwhile to add a handout of your own, or some other resource materials such as OHPs, slides, or video clips. Students will also expect you to have the answers to their queries and in the majority of instances it should not be necessary for you to have to check with the lecturer in charge. You are the expert in their eyes and if you constantly have to refer to higher authority it will undermine their confidence in you, while making untoward calls on the lecturer's time.

If reports have to be written or questions answered and handed in, then again clear guidance needs to be given about what is expected and you may need to check with the course leader what the precise requirements are for the course on which you are demonstrating. In early classes with any group some general tips on how to write laboratory or field reports will be welcomed along with more specific advice on adhering to discipline-specific conventions. In some cases, groups of students may have to deliver a presentation of their findings and you will therefore need to give thought to how they can best prepare.

Lastly, it may be advisable to check with the course leader about any individual students who may need to be given special attention because of, for example, specific learning difficulties, lack of attendance, poor laboratory reports, or problems in others areas of their work.

Safety

As a research student part of your initial training will have covered aspects of safety appropriate to your work and some of this may be relevant to your practical or field classes. It will rarely suffice to assume that, since safety regulations for conduct and good practice in laboratories are written down, the students will have read them; you must reiterate the main points and bring to their attention any specific hazards in each practical, including for instance vitally important regulations regarding clothing, eye protection, proper use of equipment, etc. Prior to the practical you should also check that the fire doors are unlocked, unless they are external alarmed ones. You should know where the nearest first-aid box is and where to find the nearest first-aider.

Your department may be able to pay for you to take an intensive training course on safety and health and this will add another valuable skill to your list of accomplishments. If appropriate you should have read the regulations on the Control of Substances Hazardous to Health (COSHH) and know the procedures to be followed in the event of an accident. The students will look to you to respond calmly but firmly, so think through what you would do if a particular accident did happen. Be familiar with the 'house rules' and, if eating and drinking are not permitted at laboratory benches, you should set a good example yourself and practise what you preach.

The Practical Itself

Figure 4 lists the things you should attend to or keep in mind during the class itself.

The desirability of taking a pro-active stance is worth highlighting; do not wait until a hand goes up seeking assistance but, rather, as you walk round the class, check how the quieter students are getting on. It is not always easy, however, to gauge the level of advice to offer; some students may not have studied the subject before and may therefore need a generous helping hand, while others may have a Higher-grade or A-level in it and need only a modicum of assistance in order to make further progress. In any event, you should never be standing around idly gazing out of a window or, worse, chatting with another demonstrator. That will convey the impression that you are uninvolved or even uninterested in how the students are getting on. Instead, you should systematically walk round the class checking on the progress of individual

THE PRACTICAL CLASS

Demonstrators should:

- arrive on time;
- liaise closely with the technician(s) and any other support staff;
- check and help with the setting-up of the equipment, specimens, etc.
- take attendance if that is required;
- start the practical with clear instructions to the whole group on learning objectives, the planned activities, the procedures for clearing up, and any issues of safety which particularly need to be drawn to their attention;
- give clear guidelines about any work to be handed in or assessed;
- allow time for questions at the outset to clear up misunderstandings;
- monitor student progress and respond quickly to raised hands;
- deal with problems arising;
- be pro-active: try to anticipate problems and deal with little local difficulties before they grow into larger and wider ones;
- keep your own notes of who has done what – especially important if there are several experiments or activities happening at once;
- sum up at the end – or better still invite students to collaborate in summing up;
- set follow-up tasks if appropriate, e.g. reading or preparation for next time;
- ensure students leave the laboratory or field in good order and equipment safe.

Figure 4

students, offering a few words of encouragement or praise and keeping an eye open for small errors in, for example, the use of technical jargon or physical units and untidy work. Naturally you will be called over by individual students but you should try to ensure that you see how every student is progressing and that you do not miss anyone. A corollary is that you should be wary of being drawn into spending excessive time on any one student or small group. If a student is having great difficulty which requires you to spend longer than, say, five minutes, it is time to take stock. Can other students help out, for example? Failing all else the student should be referred to the lecturer or supervisor; time-consuming remedial teaching is not part of your remit.

Though you should avoid being cast in the role of PC Plod, patrolling your beat and out to spot troublemakers, you can play supportive watchdog by keeping an eye on students' work and by asking questions as you walk around. Closed questions such as 'Doing fine, are you?' invites the non-committal 'yes' because a student may be reluctant to admit to being stuck or not understanding something. Open questions require longer answers and lead you into a more meaningful exchange which will allow you to gauge the level of understanding. Say, for example,

> I see you have the correct answer for this part, well done; now, how do you think you might tackle the next section?

Be sensitive too about body language: for example, a student avoiding eye contact may not only be unsure of how to proceed but may also have low self-confidence, and the challenge open to you is to assess the optimum level of assistance needed to help the student make headway without him or her feeling stupid.

With uncommunicative students it may be very difficult to assess their level of understanding and to motivate them without a two-way dialogue. Who looks puzzled? Who is bored? Or who has finished? Those who finish the allotted work early should be discouraged from leaving. Giving them more advanced exercises to work on will prevent the 'flocking' effect where the remaining students rush through their work in order to rejoin the growing 'flock' who have left early.

In some practical classes group work is encouraged and you may be called over by one individual in a group rather than by the group as a whole. Beware, therefore, of disrupting the group by speaking only to the one student, with the result that the others feel left out.

Similarly, if students are working more or less independently and one is having a problem, find out first if his or her neighbours are at the same stage and facing the same problem and encourage them to discuss it as a group. The skilful demonstrator will aim to draw out the answer from the students, and thus set them a challenge. Simply telling them the correct answer will discourage them from trying to resolve difficulties by themselves.

Some of the questions students raise can be easily answered. At other times, the question may not be clearly formulated, and you will need to probe and perhaps back-track to a point where you are sure of the student's understanding and then lead on from there. The student may be feeling nervous and unaware that you may also be anxious about your ability to help. You can initiate a conversation with:

> This looks very good, what are you going to do next?

or,

> Did you see what happened when you . . . How do you explain that?

Once you have started a dialogue, things will run more smoothly and you can then focus more sharply on the subject matter. Sometimes a question is not really a question at all, but rather a plea from a student who just does not know where to start. In this case you should help the student firstly to formulate an appropriate question and then to try and answer it. Keen students who are actively involved with their subject are usually willing to tell you what they are doing. Here your task is easier but you still need to assess their understanding and to help them with the more technical matters.

Summing-up

It is invariably helpful for the class to conclude with a brief review or summing up and you will need to allow enough time for this. Take some time before and during the practical to jot down the points you wish to see drawn out. You may wish to draw a diagram or write a complicated equation on the blackboard beforehand so that you are sure you have got it right. And while you are giving explanations of points, remember to talk to the class and not the board. If students are struggling to understand, an explanation that is confusing and disjointed will only make matters worse. Drawing things to a conclusion and highlighting principles self-evidently aids understanding. It is also worthwhile to make sure that the links between the practical work and the theory have been made explicit: if appropriate, go over the exercise with the class while talking through it so that the students have an opportunity to watch how an expert goes about it. If appropriate, you could point out any follow-up reading or additional work that could be done.

FIELD CLASSES

Field classes offer various advantages and these are summarised in *figure 5*.

HOW DO STUDENTS BENEFIT FROM FIELDWORK?[3]

Students can gain the following advantages from field classes:

- They can observe first hand, or actually experience some of the phenomena of their subject. These might otherwise remain merely as 'stories' in texts. Who really knows what a chalk down is who has never walked on one?
- Students can obtain a real life experience of the realities of certain industrial, professional or environmental problems. Erosion is a physical fact that you can go and see for yourself. And when you have tried surveying, you have more respect for map makers.
- Related but distinct, is the hands-on experience of how hard it sometimes is to do well at some professional practice. How many species can you really put a name to? And, even if you do like looking at aerial photographs, can you take them yourself, even when you are feeling airsick?
- They can see the difference between the controlled variables of laboratory physiology and the irreducibly complex situation in the field.
- Students get a chance to think of questions they might otherwise not think of. I could not have asked the question I posed about 4th century Roman pottery, unless I had been present when it was unearthed.
- Finally, there is the matter of going there – and being there – the education gained from going to a place new to you, and being obliged to give it your most careful attention.

Figure 5

However, field classes do pose some special problems which include:

- safety - including the particular requirements that might be posed when the class takes place in difficult terrain or at a complex installation or plant involving hazardous processes;
- equipment - operation and safety;
- transport and logistics;

- student's disabilities or medical conditions - which will involve making sure beforehand that you are well-briefed about any such students in your group.

Any or all of these may call for rather more preparation than would be the case for a routine laboratory practical.

If students are given a pre-excursion briefing, be sure that you attend and obtain any documentation that is relevant. Indeed, if staff are conducting a pre-visit to the locality the demonstrators should be included. Safety is very important and appropriate clothing must be worn with specialist equipment where necessary; for example, hard hats for quarry visits. The students are not constrained within the four walls of a laboratory and one role of the demonstrator is to act as sheep-dog to ensure the party sticks together. Regular head counts may be necessary and often, with the lecturer concentrating on the science or engineering aspects, the responsibility falls to the demonstrators. If much walking is involved the party can easily get strung out and it is important to ensure that those at the rear do not miss out on any explanations.

Freedom from the laboratory may express itself in freedom to take liberties and start larking about. This must be handled carefully but firmly to avoid any incident getting out of hand and becoming a threat to the safety of the party. All the rules of the laboratory should pertain to excursions whether on buses or in the field.

Excursions often involve a greater degree of informality. In what ways could you capitalise on this to achieve high quality learning and encourage collaboration within and between groups.

POTENTIALLY TRICKY SITUATIONS

The practical exercise fails or goes wrong. Resist the urge to panic if things go wrong; it happens to everyone and you can no doubt recall mishaps when you were a student. Try to explore with a group or student why things have failed; check instructions have been followed; have you forgotten to mention a crucial point?; find out if it is an isolated incident or whether others are having trouble. If there is a problem with the whole class then the staff member in charge should be called in to review the situation. It could even be an opportunity to engage in some problem solving. If the equipment has broken down or failed you should call in the technician and not try to mend it yourself. In the meantime the students affected could join with another group, if appropriate.

A student is not pulling his/her weight in a group. Talk to the whole group about what they are working on. Try to involve everyone in the discussion and ask the less-than-involved students for their views and to outline their part in the proceedings. It may be necessary to allocate changed tasks within the group to engage the student with the work. Make a personal note that the students may have to be regrouped next session, if the problem persists.

Arguments between students. It is best not to get drawn into such arguments; rather be alert to the possibilities of tensions developing and move swiftly to defuse things. Focusing on the task in hand rather than on the dispute and trying to get the students to re-engage with the material with comments to encourage or direct them should help.

Disruptive students. This is likely to happen only rarely, but if it does you must move quickly and firmly to deal with the situation. Students who have given up because the task is too difficult, or because they have finished early and are restless, or for any other reason may become disruptive. Peer pressure is powerful and a single disruptive student may distract a number of others. There may be laboratory rules regarding conferring, moving around, etc. to prevent any particular student's behaviour becoming a problem and a swift reminder of these should be all that is necessary. However, if it is not, then it is the responsibility of the staff member on duty to sort it out. If safety is compromised then you must clearly act straight away to stop the student's behaviour. The safety of the whole class is of prime importance and if necessary the disruptive student should be required to leave and the staff in charge told.

An accident occurs. Think through in the planning stages for a session what you would do if an accident happens, whether in the laboratory or a field class. It is better to have thought this through rather than having to react on impulse, and you will be alert to possible hazards for each exercise. Students will expect you to know what to do. In the section on safety above, the importance of knowing the COSHH procedures was stressed. You have to deal with an accident straightaway and call in the first-aider if necessary and/or evacuate the laboratory. All accidents need to be recorded in the accident book and this is probably held with the technician.

Figure 6

Potentially Tricky Situations

You should take care not to be so engrossed in one group's problems that you lose sight of what is going on in the rest of the class. Remember that you are responsible for everyone and regularly keep a watchful eye on the whole group. *Figure 6* contains some potentially tricky situations with suggestions of what you might do.

ASSESSMENT

Reports of laboratory or field work have a well-defined structure and it is part of their training that students must develop the craft of writing their reports to conform with what professionals in their discipline expect.

If you are involved with assessing the students' reports from laboratory or field classes, chapter 6

LABORATORY REPORT ATTACHMENT SHEET[4]					
Name		Marker			
Date in		Date back			Mark
Student's specific requests for feedback					
Marker's general view of the work					
Rating scale		*Excellent*	*Good enough*	*Not good enough yet*	*Comments*
Title and headings					
Summary					
Introduction:	Importance				
	Background				
	Objective(s)				
	Apparatus				
Procedure					
Theory					
Results:	Presentation				
	Accuracy				
Discussion					
Conclusions					
English:	Sentence construction				
	Spelling				
	Clarity				
Tables					
Figures					
Overall assessment **Areas for improvement** 1. 2.					

Figure 7

LAB BRIEFING AND ASSESSMENT SHEET[5]

Lab ....

Student ....

Section	Briefing	Max. Mark	Your Mark	Feedback
Introduction Background				
Methodology Use of equipment				
Results Data analysis				
Discussion Conclusion				

Figure 8

Marking and Commenting on Essays may be read for more detail. You will need to get together with the teaching staff and other demonstrators to ensure that a consistent approach to marking is being followed. You will need to be clear in your own mind what the criteria are for what is an acceptable answer and what is not.

In many cases, a student assessment and feedback sheet of the kind shown in *figures 7* and *8* is used. And if you have some discretion over how you mark and comment on students' lab or field reports, you may like to consider using these examples as they stand, or in an appropriately modified form. 'Attachment sheets' or pro-formas of this kind can help you achieve consistency, while giving students well-focused feedback on the strengths and weaknesses of their written work.

CONCLUDING COMMENTS

In the light of the preceding discussion, it hardly needs saying that the role of the demonstrator is a challenging one. And while demonstrators generally have much less discretion over what and how they teach than do many tutors, the demonstrator's responsibilities, as we have seen, are no less exacting. Practical and field classes are usually much longer than tutorials, are often organisationally more complex, and are more critically reliant on the use of specialised equipment, facilities and materials. They also normally involve much larger numbers of students, all of whom will be looking to the demonstrator for information, expertise and guidance, deftly and sensitively given. Only very rarely, however, will a new demonstrator find that he or she can rise to this array of challenges with effortless ease. As with any other demanding professional role, success will come not just from being well-prepared but also from taking stock: what aspects of the role are being done well, and which need more attention? Chapter 10, *Feedback on Teaching*, outlines various ways in which you can periodically review your effectiveness – and indeed relish the many tangible contributions you can make to your students' learning. As a Bristol University student once observed:[6]

> The demonstrator usually manages to find something you aren't clear on and quiz you about it, so that by the end, you do get a little bit more understanding about it.

It is often in such small triumphs as this, steadily accumulating from practical to practical, that the greatest rewards of the demonstrating role are to be found.

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