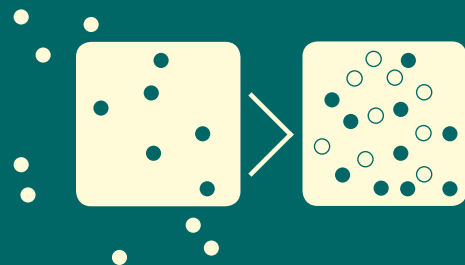


*Being inclusive in...*

# Laboratory Practical Sessions



## WHAT?

## HOW?

## WHY?

### 1. Designing a laboratory practical

Anticipate diversity

Include a slide in introductory lectures giving the name of the person that students need to speak to if they have any anxieties or specific needs in the lab environment.

This demonstrates that such discussions are welcome, and ensures that students know who to approach from the outset.

Teach core and basic skills gradually

Incorporate instruction on basic lab skills into the first year for undergraduate students.<sup>1</sup> Stagger new techniques into different experiments to gradually build up a knowledge base without overloading the students.<sup>2</sup> Lab manuals could also include reduced contents to suit the needs of the students at that level.

A diverse student cohort means different levels of skills and knowledge. Assuming that students have core and basic lab skills will mean that some students struggle to benefit from the practical session. Students may need referring back to basic guidance in later years to refresh and embed their knowledge.

Encourage pre-reading / videos

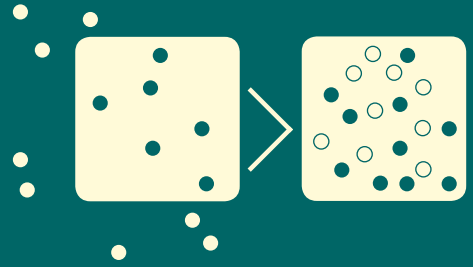
Publish the introduction for the practical before the laboratory and ask the students to interact through formative assessment. [Videos of lab](#) work can also help students anticipate what the lab session will involve.

Students become accustomed to a culture of preparing fully for a laboratory practical and it allows those who are having difficulty with the material a chance to determine what knowledge is expected to perform the practical experiment adequately.<sup>3</sup>

The complete set of **Being Inclusive In...** guides is available at <http://www.sdduonline.leeds.ac.uk/inclusiveteaching>

Being inclusive in...

# Laboratory Practical Sessions



## WHAT?

Use verbal and written instructions

## HOW?

Support verbal instructions with written and visual instructions, including diagrams and video to appeal to different learning needs. [Written instructions](#) should be numbered, clearly spaced out and use size 12 point sans serif font.

## WHY?

Using different modes of instruction will benefit all students and allow them to recap in their own time and take in the information at a pace that suits them. These should be made available in advance.

Ensure the learning outcomes of the practical are clear

Provide experimental procedures in advance and list the main aims of the experiments, but also list the practical skills the student may learn or demonstrate during the activity.

This allows all students to be certain of the aims and outcomes of the experiments and to have time to read up about procedures and methods they are unsure of. This reduces anxiety and gives students opportunity to plan for needs arising with respect to their specific needs before arriving at the practical.

Give thorough safety training and assess this knowledge

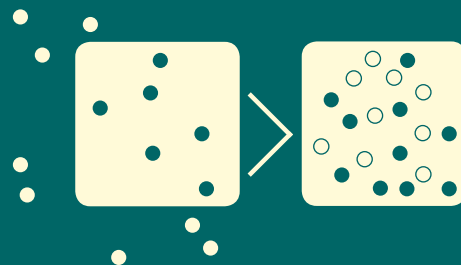
Ensure students take seriously the activity of learning usual safety procedures in the laboratory. Highlight aspects of danger AND safety.

While some aspects of laboratory safety seem obvious, learners with some processing difficulties may not make the same assessments of danger as you might expect. Assessing this knowledge meaningfully allows the student to gauge their understanding of the safety of their conduct leading to reduced anxiety in the laboratory.

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# Laboratory Practical Sessions



## WHAT?

Give a map or diagram showing where apparatus is – perhaps in a booklet

Consider the number of demonstrators

Consider change to implement a quiet working space

## HOW?

If the equipment is not provided at workstations, include both visual and written descriptions of the locations of required equipment where possible.

Where possible, provide more demonstrators or members of academic staff in the first sessions of a laboratory practical.

If possible, reserve one space of the lab specifically for quiet work and ask demonstrators to enforce this rule.

## WHY?

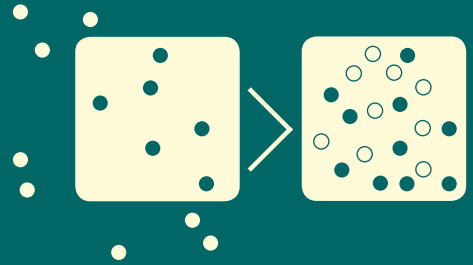
Some students need to plan out the whole procedure before the laboratory practical commences. By allowing the students autonomy in finding apparatus, rather than over relying on demonstrators, stress is reduced in the laboratory.

In the first sessions students are often nervous and require reassurance. Ensuring the first session is as stress-free as possible sets a precedent for calm working within the laboratory. Consider balancing the gender mix of demonstrators in the laboratory as some students may seek a sense of belonging.<sup>4</sup>

A quiet space reduces distraction for students who find it difficult to concentrate with background noise and allows them to focus more fully on the task. Some students may choose to use the quiet space if they feel anxious about working in the laboratory environment.

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# Being inclusive in... Laboratory Practical Sessions



## WHAT?

Provide timing information

Provide training and support for demonstrators

## HOW?

If possible, break the practical experiment down into tasks and give suggested timings for each task where you think this will be useful.

Encourage demonstrators to be inclusive in their work and to access resources and training in this area. Shadowing more experienced colleagues can also help.

## WHY?

This allows all students to plan their time effectively, reducing risk of rushing. This skill is particularly difficult for students with specific learning difficulties (SpLDs) and autism spectrum conditions.

Demonstrators may have little prior experience of considering issues of inclusivity in lab settings and may make assumptions about the level of support or assistance that students require.

## 2. During the laboratory practical

Define apparatus

Ensure clarity in demonstrations

Unless the task is to be assessed, consider providing a glossary of the names of apparatus with pictures. If the lab is guided, begin the session by naming the equipment in use.

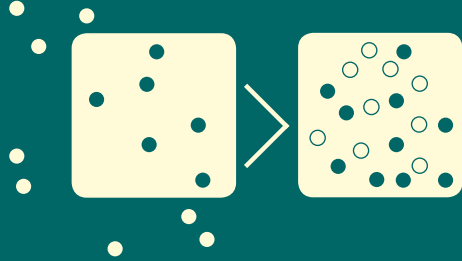
Demonstrators need to ensure that they have the attention of all students before speaking and that all students can see their mouth. Make sure actions and verbal descriptions are explicit.

Some learners find it difficult to remember the names of equipment and may not understand the instructions given to them regarding what equipment to use. This could lead to unsafe practice.

Students with hearing impairments will need to watch the demonstration while listening closely / watching someone speak. They will need time to look at the action. Students with attention difficulties may become easily distracted in busy environments. This helps students' sign-language interpreters or note-takers, or those with a visual impairment.

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# Being inclusive in... Laboratory Practical Sessions



## WHAT?

Encourage a culture of disclosure

## HOW?

While discussing safety emphasise the idea that one aspect of safety is being confident in your own ability to perform the task safely.

## WHY?

Learners may have suffered traumatic experiences which has left them with a phobia of fire, etc. Ensure your demonstrators are aware this may be an issue and encourage students to disclose privately with staff or demonstrators.

### 3. Developing lab skills

Provide access to resources

Ensure students have access to support and materials for any background knowledge, concepts and skills they may need for the lab.

Students may be at different starting points or may need additional support to consolidate their understanding around things such as maths and basic lab calculations, depending on their learning style and prior knowledge.

Provide guidance for recording results

Give guidance on recording methodology, observations, results and interpretation. Encourage students to develop systems that work well for them e.g. creating their own templates.

Students with organisational difficulties, such as those with SpLDs may not work systematically and risk having an incomplete record of the lab session.

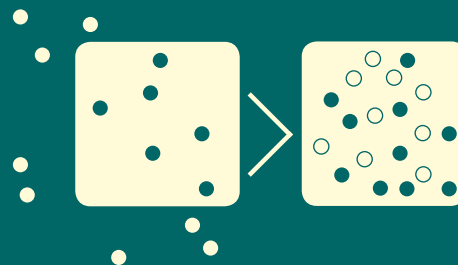
Provide guidance for lab reports in early stages

Give clear information and examples about the format, layout and expected content of lab reports, ensuring that students can easily refer to this guidance when required.

Some students have difficulty organising information in a linear sequence and may have no prior experience of writing lab reports.

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# Being inclusive in... Laboratory Practical Sessions



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With thanks to Priska Scheonborn and Wendy Miller of Plymouth University for allowing us to use and adapt their series of guides: <https://www.plymouth.ac.uk/your-university/teaching-and-learning/inclusivity>

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