

# The Practical Planner

Set Objectives → Outcomes made clear → Preparation → Practical → Problems → Pack away → Reflection

Practical work is fundamental in science, as it is the link between the real world and scientific ideas. Successful [whole-class practical work](#) is hard. It requires students to know what they are doing and to have the necessary knowledge and skills to be successful. Practical work goes wrong when students are overwhelmed. We can help students to be successful in practical work by (i) establishing clear routines and (ii) ensure intended learning is focused and builds on the prior knowledge and skills that students have developed in previous lessons. I hope the table below will help plan for great practical work – it should not limit innovation!

Further ideas on practical work in science can be found here: <http://thescienceteacher.co.uk/practical-work/>

Phase of planning	Knowledge and Understanding	Notes about the phase	Examples and tips
Set the objectives	What Knowledge and Skills do <b>you</b> want students to learn?	<ul style="list-style-type: none"> <li>Consider both the <a href="#">procedural and conceptual demands</a> – don't overload students in what you want them to do</li> <li>Are the aims <a href="#">Illustrative? An Exercise? Or investigative?</a></li> <li>What apparatus and technique skills will students develop in this practical?</li> <li>What knowledge and understanding will students gain from doing this practical?</li> <li>What prior knowledge and skills are you assuming students have?</li> </ul>	<p>Carry out the practical yourself first!</p> <p><a href="#">Try using split screen objectives to articulate both skills and knowledge.</a></p> <p>Be as specific as you can – e.g. filtration would involve: folding filter paper and may require use of clamp and stand and rinsing. What you define matters!</p>
Outcomes made clear	How will <b>your students</b> know what they are doing/learning?	<ul style="list-style-type: none"> <li>So often students are not aware of the purpose of the practical and this leads to confusion. It is really important to share the desired outcome in a way that makes sense to students. If students understand and internalise the aim of the practical, they are better able to find a solution when they get stuck.</li> </ul>	<ul style="list-style-type: none"> <li>Ask students to make a prediction</li> <li>Ask students to create the results table first to focus them on the outcome or plan an aspect of the practical</li> <li>Set the practical as a challenge e.g. who can make the most NaCl?– use google docs to record results</li> <li><a href="#">Use a context that makes sense</a> – e.g. we are stranded on a desert island and need some salt for our fish and chips</li> </ul>

Phase of planning	Knowledge and Understanding	Notes about the phase	Examples and tips
Preparation	How will your students know how to carry out the practical and collect apparatus?	<ul style="list-style-type: none"> <li>The key here is don't front load all instructions at the start – you can't tell students everything they need to know! I find the best way to help students is to first give them a very quick overview of the method and then hone in on specific aspects you want to develop. It's OK for students to make mistakes during the practical. If you find yourself needing to explain everything, STOP! The practical is too demanding and you need to re-think what knowledge and skills you assumed students had.</li> <li><i>Collecting apparatus is all about establishing routines at the start of the term.</i></li> </ul>	<ul style="list-style-type: none"> <li>Give students a copy of a method to read first, and then review key aspects as a demo. Use students in the demo.</li> <li>Get students to identify mistakes in a method</li> <li>Demo the method in the lesson before</li> <li>Set a pre-lesson task to watch a clip showing the practical carried out but don't ruin the surprise!</li> <li><i>Students work in practical pairs, person A and person B. Spread apparatus around the lab in 2 main areas. Person A collects from area 1, Person B collects from area 2.</i></li> <li><i>Create a bird's eye plan of the lab and get students to mark on where all apparatus is stored. Do this at the start of the term. Place a copy of this on the classroom wall.</i></li> </ul>
Practical	How will your students carry out the practical?	<ul style="list-style-type: none"> <li>One of the biggest challenges for practical work is to ensure the teacher always has good visibility. Stand at the front of the class and don't initially get sucked into supporting individual groups.</li> <li>Once students are working well you can then move around the lab giving feedback and narrating the positives that are happening</li> </ul>	<ul style="list-style-type: none"> <li>Go around the class lighting Bunsen burners – but only for groups who are well-set up. Narrate the positive and soon all groups will be ready!</li> <li>If students have problems, ask them to come to you to prevent you from losing oversight of what the class is doing.</li> <li>Establish a routine for stopping the class quickly so you can give in-the-moment feedback e.g. 3,2,1 stop!</li> </ul>
Problems	What will your students do when they are finished?	<ul style="list-style-type: none"> <li>It can be really hard to make sure all students finish at the same time. To get around this problem it's a good idea to set the questions/follow up work before students start the practical. Questions should be based around the intended learning outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>Questions on the board about what would happen if... e.g. what would happen to my product if I evaporated off all the water?</li> <li>Focused evaluation e.g. how could you change the method to produce a higher yield?</li> <li>Produce a graph</li> </ul>
Pack away	How will students know how and when to pack away?	<ul style="list-style-type: none"> <li>Packing away apparatus is all about establishing routines at the start of the term. Students should know what to do before they get to this stage. It is best for students to be autonomous in packing away so you don't get dead time and they can get going on completing the problems.</li> </ul>	<ul style="list-style-type: none"> <li>Create a bird's eye plan of the lab and get students to mark on where all dirty apparatus is placed. Do this at the start of the term. Stick to the same routine. Place a copy of this on the classroom wall.</li> <li>Assign sink and tidy station monitors at the start of the term to help you.</li> </ul>
Reflection?	How will you reflect and capture the learning that has and has not happened?	<ul style="list-style-type: none"> <li>One of the biggest criticisms of practical work is that students do not have time to reflect on what was learnt. Make sure you plan time to do this so that you identify and resolve any misconceptions!</li> </ul>	<ul style="list-style-type: none"> <li>Was your prediction right? Capture and review class results on excel – share data and <b>use</b> in next lesson</li> <li>What were the challenges and what went well?</li> <li>Return to intended learning outcomes. How did we do?</li> </ul>