



# School report

**Barriers to  
practical  
science**

The school report briefing series draws on research from STEM teachers across the UK. This briefing focuses on the views of 398 science teachers from our 800-teacher sample. Findings from EngineeringUK and The Royal Society's Science Education Tracker highlighted a decline in hands-on practical science, and this report looks at the barriers teachers face in delivering these lessons. The aim is to understand how best to support schools and teachers to enrich young people's learning with practical lessons.

# Findings from the Science Education Tracker

**AS HIGHLIGHTED** in the Science Education Tracker (SET),<sup>1</sup> enjoyment of practical science is the most important motivator to learning science for students in years 7 to 9 (52%). It is particularly important to young people who are less engaged in science. Doing too little practical science is also a demotivating factor for further study.



Despite its popularity and importance, the frequency of hands-on practical science has dropped. In 2016, 44% of students were doing hands-on practical work at least once a fortnight. This declined to 37% in 2019 and again to 26% in 2023. Restrictions during the Covid pandemic meant it wasn't possible for students to do hands-on practical work. However, even prior to the pandemic there was a shift away from both hands-on practicals and watching teacher demonstrations and towards video-based learning. In 2021, GCSE and A level exams resumed without requiring students to demonstrate practical skills. This requirement has since returned, but a legacy of this trend has remained. The percentage of GCSE students watching a video of practicals at least fortnightly increased from 39% in 2016 to 46% in 2023.

The AQA conducted some research looking at the impact of Covid-19 on practical skills, the main finding from this was students felt their hands-on skills suffered the most during the pandemic. The research from the AQA is underpinning further research being led by the University of Durham and

University of Liverpool. This research aims to understand the long-term skills gap faced by first year university students.<sup>2</sup>

In the SET research young people across the different year groups all indicated they are doing less hands-on practical work than they would like to. This was particularly high for students who said they were not interested in science and for those who said science is not for them. Female students were also more likely to be motivated by doing practical work (54% to 50% of male students). They were more likely to be motivated by practical elements of science learning including having a good teacher (40% vs 33% of male students). Enjoyment of science and continuing to study science subjects beyond the point of which they are compulsory are very interconnected. Young people without strong engagement in science are likely to be the group missing out the most by reduced practical science in schools. To have a diverse and growing engineering and technology workforce, we need more young people engaged in science.

<sup>1</sup> Science Education Tracker 2024, April 2024, EngineeringUK and Royal Society

<sup>2</sup> [www.aqa.org.uk/blog/impact-of-covid-19-on-practical-skills](https://www.aqa.org.uk/blog/impact-of-covid-19-on-practical-skills)



# Barriers to practical science

**THE FOLLOWING** section includes insights from teachers about the barriers to delivering lessons where students have hands-on practical work. Only 16% of teachers said they did not face any barriers to delivering hands-on practical work, showing they exist for most teachers.

Perhaps unsurprisingly, demands of the curriculum (44%) and time (37%) are the biggest barriers for teachers in delivering lessons where students have hands-on practical work. When giving written responses in the survey, several teachers made direct reference to the time needed and how relevant they can make practical lessons to learning outcomes for their students. They highlighted that it was difficult to justify the time needed for preparation, delivery and clearing away. Teachers feeling that curriculum demands prevented them delivering practical lessons is a worrying development.

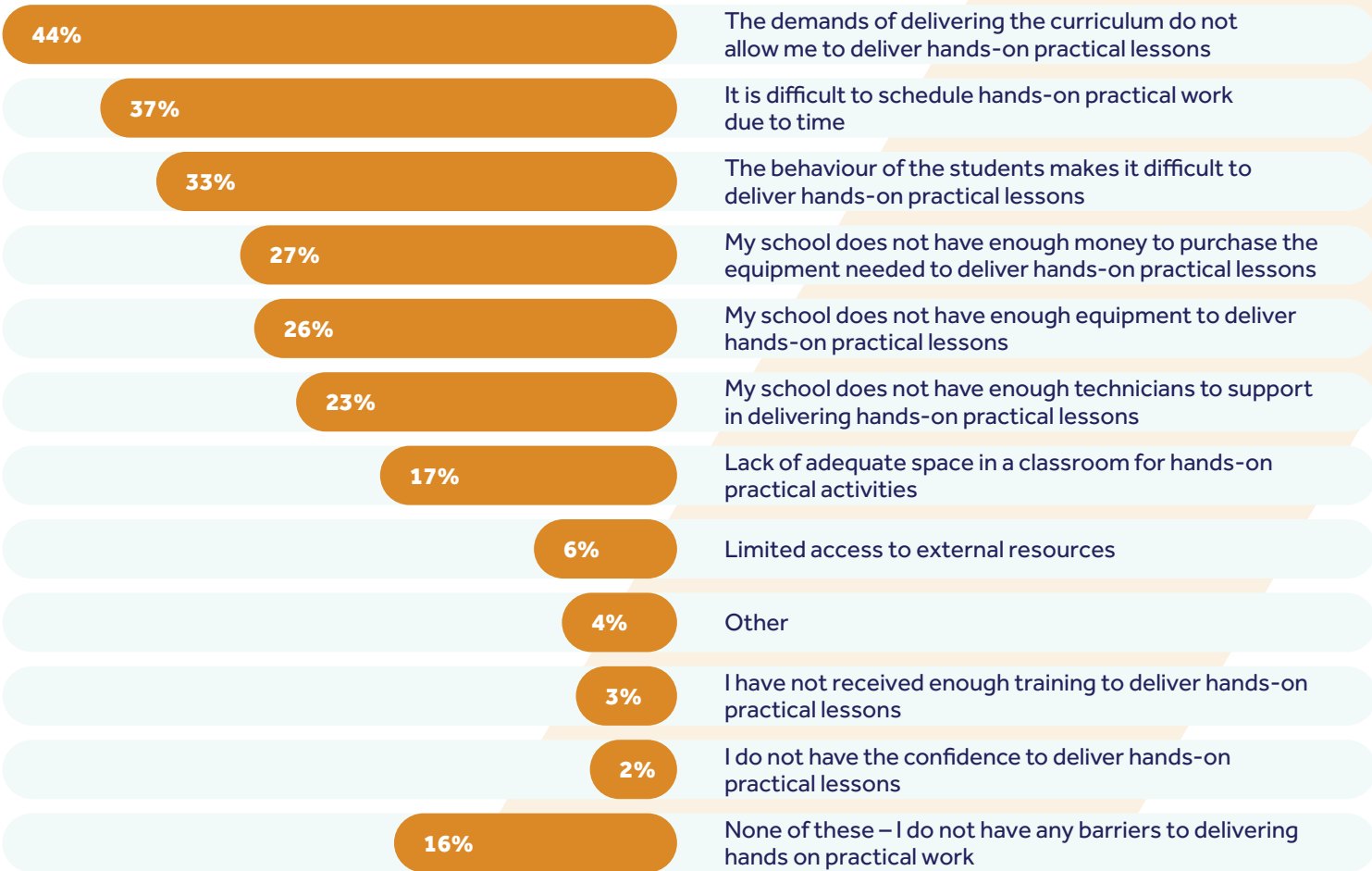
Around a third of respondents (33%) highlighted student behaviour as a barrier to delivering hands-on practicals. There have been numerous reports highlighting the increase in behavioural issues in schools since the pandemic. For example, in England there has been a 40% increase in suspensions between autumn term 2022/23 and

autumn term 2023/24 (214,078 to 300,300) in state-funded secondary schools, and it has more than doubled since the 2019/20 autumn term (143,006 to 300,300).

Most other reasons highlighted by teachers are due to a lack of resources, due to lack of equipment (26%) or not having the money to buy the equipment needed (27%). Similarly, not having enough technicians was highlighted by over a fifth of respondents (23%). Just under half of respondents (45%) highlighted one or more of these school-based equipment and resources issues as a barrier.

When asked about the impact of vacancies in their departments, 39% of teachers said these had resulted in young people receiving fewer hands-on practical lessons. This shows that in addition to the practical classroom-based barriers, recruitment issues also contribute to a reduction of hands-on practical lessons for students. We explore the impact of teacher vacancies in more detail in 'School report: The challenge of STEM teacher recruitment and retention'.

## What are the barriers to delivering a lesson where the students have hands-on practical work?



'Don't know' was also an option, but was selected by 0% of respondents.





# Conclusion

**IN CONCLUSION**, the decline in hands-on practical science in schools as highlighted by the Science Education Tracker is a significant concern.

Practical science is crucial for student engagement and motivation, particularly for those who are less interested in science. The barriers to delivering hands-on practical lessons are mainly driven by time constraints and curriculum demands, with additional challenges such as student behaviour, lack of resources, and insufficient technicians. Addressing these barriers is essential to ensure that young people can benefit from practical learning experiences, which are vital for their continued interest and success in science subjects.



## Recommendations

- The government uses the opportunity of the current curriculum and assessment review to address the volume of content in the curriculum. We are concerned that this content overload in the curriculum in England has led to the reduction in practical work in science lessons
- Ensure that practical science is an essential part of the curriculum, and students experience a practical activity in at least half of their lessons. As recommended in the Gatsby Good practical science report<sup>3</sup>
- Ensure that schools have the resources needed to provide students with the opportunity to participate regularly in hands-on practical lessons. This should include the equipment to carry out practicals and the technician staffing levels to support their delivery

<sup>3</sup> [Good practical science, September 2017, Gatsby.](#)