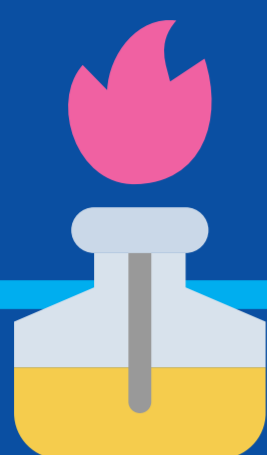


GOOD PRACTICAL SCIENCE

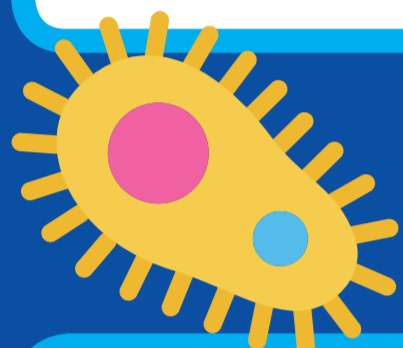
- MAKING IT HAPPEN



Why should my school prioritise practical science?

'Hands on practical work is an essential part of learning science, and it also develops valuable skills and attitudes.'

ASE's President, Professor Sir John Holman, in the Good Practical Science report. See the five purposes of practical science in the box below.



We'd like to develop our practical science. Where do we start?

ASE recommends starting with benchmark 1: planned practical science.

ASE has developed seven flexible one-hour modules for science teams to use for professional development to draw up an impactful practical science policy. These modules also support you to work towards benchmarks 2 and 4.



I'm a technician. How can science teams make the most of their technicians? How can I be supported to do my job more effectively?

Professional learning opportunities are provided by ASE, CLEAPSS, IOP, RSB and RSC. See also ASE and CLEAPSS resources for technicians. Consider applying for RSciTech in recognition of your expertise and experience.

'Technicians are at the heart of practical work in schools and colleges. They prepare, maintain and collate all resources. They advise teachers on what works well and safely, and often support students directly. Technicians are at the forefront of new ideas and technology, developing and sharing innovative practicals with their strong local and national networks. Without technicians, practical work would not happen.'

Simon Quinnell, ASE Chair 2020-21



Purposes of Practical Science

- A To teach the principles of scientific enquiry
- B To improve understanding of theory through practical experience
- C To teach specific practical skills (such as measurement and observation) that may be useful in future study or employment
- D To motivate and engage students
- E To develop higher level thinking skills and attributes such as communication, teamwork and perseverance.

Visit ase.org.uk/goodpracsci for resources, case studies and to read the full report

This Good Practical Science project is supported by the Gatsby Charitable Foundation

How can we ensure that our practical science teaching is effective?

The Good Practical Science report provides a framework for world-class practical science based on international evidence.

This takes the form of 10 benchmarks against which schools can judge their provision. In many ways the ingredients of good practical science are the ingredients of all good science learning - expert teachers, well-planned lessons and technical support (benchmarks 1, 3 and 6).

What are the benefits of generating a practical science policy?

Producing a policy encourages teachers and technicians to think collectively as a department about why and how they approach practical science. The Good Practical Science report found that practical science is most effective when staff and students are clear about why they are doing it.

ASE has collated case studies of how five very different science departments went about creating their policies, and the impact these processes had on their teaching. Each case study includes a copy of their policy.

'It has been excellent to focus the department on the best use of practical activities within lessons, and the materials provided have created some of the best department CPD sessions we have had for a while. I have adapted the materials to make them fit the needs of my department and, in my visits to lessons, I can see a greater clarity and explicitness in the planning of practical activities for specific aims, which is great to see.'

Euan Douglas, Head of Science
St George Catholic College

I'm a teacher. What support is there to help me develop my expertise?

Professional learning opportunities are provided by ASE, CLEAPSS, IOP, RSB, RSC and STEM Learning. See also ASE's journals, IOPspark and RSC LearnChemistry. Consider applying for CSciTech in recognition of your experience, expertise and commitment to the profession.

BENCHMARK 1

Planned practical science: Every school should have a written policy that explains why teachers use practical science, the outcomes they expect from it and how they achieve those outcomes. The process of producing the policy is as important as the policy itself.

BENCHMARK 3

Expert teachers: Teachers should have subject-specialist training (both initial and continuing) in the subject (biology, chemistry, physics etc) and age range they teach, so they can carry out practical science with confidence and knowledge of the underlying principles.

BENCHMARK 6

Technical support: Science departments should have enough technical or technician support to enable teachers to carry out frequent and effective practical science.

BENCHMARK 2

Purposeful practical science: Teachers should know the purpose of any practical science activity, and it should be planned and executed so it is effective and integrated with other science learning.

BENCHMARK 4

Frequent and varied practical science: Students should experience a practical activity in at least half of their science lessons. These activities can be short or long, but should be varied in type.

BENCHMARK 5

Laboratory equipment and facilities: Schools should have enough laboratories to make it possible for every teacher to do frequent practical science safely. Each laboratory should have sufficient equipment for students to work in small groups. See ASE and CLEAPSS guidance on laboratory design.

BENCHMARK 7

Real experiments, virtual enhancements: Teachers should use digital technologies to support and enhance practical experience, but not to replace it.

BENCHMARK 8

Investigative projects: Students should have opportunities to do open-ended and extended investigative projects.

BENCHMARK 9

A balanced approach to risk: Students' experience of practical science should not be restricted by unnecessary risk aversion. See ASE and CLEAPSS guidance on best practice in health, safety and risk assessment.

BENCHMARK 10

Assessment fit for purpose: Assessment of students' work in science should include assessment of their practical knowledge, skills and behaviours. This applies to both formative and summative assessment.