The Association for Science Education
Promoting Excellence in Science Teaching and Learning

Best Practice Guidance

Guidance on Assessment in Science

Context

There are a number of purposes for assessment in education:

- assessment is **summative** when attainment is measured at a particular moment in time and the outcomes are reported to others, including school leaders, parents and employers, for example using end of topic tests and public examinations. Outcomes from summative assessments may also be used for **quality assurance**, to monitor the effectiveness of the teacher, school, or system.
- assessment can also be used for **formative** purposes when the evidence is used by teachers and learners to inform decisions about what happens next in teaching and learning.
- there is a further purpose for assessment in **clarifying** the intended learning outcomes for the teacher and learner – for example, knowing what students are expected to do in an examination helps teachers understand what is intended by the specification.

This guidance focuses on the uses of assessment to improve teaching and learning.

The position of ASE

- For assessment to be effective and informative teachers should plan their teaching with assessment in mind.
- Continuity between phases of education is vital to ensure that children's prior knowledge and skills are acknowledged and built on, and that any gaps are addressed.
- We encourage Senior Leaders to support the professional development of science teachers, as confident professionals, who are able to use a range of formative assessment tools to identify appropriate interventions that will progress the learning; information from these assessments may at times be used for summative purposes.
- A good assessment policy will be clear about how assessment outcomes will be used to support teaching, how often they need to be recorded for summative purposes and how they might be communicated to parents.

Best practice should seek to include

- The use of formative assessment to inform day-to-day planning. Teachers should consider what it means for children to have secure knowledge and understanding of a chosen aspect of the science curriculum, and what tasks will provide evidence of learning,
- Responsive teaching: planning formative assessment activities should also include considering the response the teacher will make once the information is collected.
- Opportunities for children to express their understanding in a variety of ways, not just on paper: what might they say, do, write or draw? This will lead to the use of a variety of assessment strategies.
- Assessment activities that probe understanding and reveal misconceptions so these can be tackled, rather than focusing solely on knowledge and key words. An over-reliance on test/examination questions as a basis for formative assessment should be avoided as this could limit progress in scientific understanding.
- The use of formative assessment which recognises the context of the learning that has gone before. It is helpful when clusters of schools collaborate to ensure that the children have studied a common core body of science knowledge in primary school to support their progression to secondary school.

Useful links

Nuffield / ASE report Developing policy, principles and practice in primary science

PLAN – the Pan London Assessment Network has developed assessment guidance for primary schools related to statements for science in the National Curriculum for England – also useful for secondary schools planning the teaching of pupils in year 7.

Teacher Assessment in Primary Science Project (TAPS) has developed the TAPS pyramid tool to provide schools with a supportive structure to evaluate and develop their assessment processes. There is also a database of activities to support with the assessment of working scientifically skills.

STEM learning worked with Christine Harrison and Dylan Wiliam to produce a free online course *Assessment for Learning in STEM Teaching* which is available on the FutureLearn platform.

Department for Education

Assessment without levels – Advice for schools on assessment after the removal of the national curriculum levels system for grading students

Other publications

Black, P., & Wiliam, D. (2018). Classroom assessment and pedagogy. *Assessment in Education: Principles, Policy & Practice*, 1-25. doi:10.1080/0969594X.2018.1441807

Wiliam, D. (2011). *Embedded formative assessment*. Bloomington, IN: Solution Tree Press.

Harrison, C. (2013). *Testing times: Reforming classroom teaching through assessment, c*hapter in Excellence and Equity IPPR