

Although the assessment procedures schools are expected to carry out are currently under review, at present, levels for pupils are still reported at the end of KS1 and KS2 based on teacher assessment. Teachers are expected to report on all four strands of the National Curriculum (Sc1: Scientific Enquiry; Sc2: Life processes and living things; Sc3: Materials and their properties; and Sc4: Physical Processes.) The statutory assessment of science, therefore, falls into two categories – the assessment of scientific enquiry (skills) and the assessment of knowledge and understanding.

Although teachers are only required to report levels at the end of each Key Stage the best way to ensure that children make good progress is through using assessment for learning. If you wait to make assessments until the end of the Key Stage you will have missed the opportunity to promote children's learning by finding how what they do or do not know and making plans to move their learning forward.

### Assessment of knowledge and understanding

One of the best ways for you to find out about children's knowledge and understanding is to listen to them discussing their ideas with their peers. By listening to these conversations you gain a clearer idea of the child's current understanding. This has two benefits: first, it often becomes apparent that the children do not have the correct scientific vocabulary to express their thoughts clearly. This is the time for you to intervene and teach key scientific vocabulary explicitly. The children are more likely to remember this vocabulary as they need to use it instantly and it is taught in a context with

# KEEP AN EYE OUT

Assessment for learning in science means watching and listening during lessons in which you challenge children's understanding, say the IOE's Naomi Hiscock and Jane Maloney...

which they are familiar. Second, it provides you with the opportunity to adapt future lessons to focus on further opportunities for children to revisit their ideas and revise their misconceptions.

It is not possible to listen to the conversations of all pupils during a given period so it is important to target children for which you have less evidence of their learning from previous activities – perhaps children that are less willing to share their ideas?

### Two strategies for stimulating discussions

By experiencing something that contradicts previous understanding, children will need to re-evaluate their ideas. For example, a group of children all agreed that sounds travel more easily through a gas than a solid; they knew that we shut the door to block out sounds. However, when presented with a pair of ear gongs\* it became clear that the sound in fact travelled very easily through a solid. Thus they had to revise their previous explanations and this allowed their teacher to assess not only the children's understanding of how sounds travel but also their understanding of solids and gases. Another technique is to present

children with different opinions about a situation, encouraging them to explore the validity of different ideas, for example, using concept cartoons (Naylor & Keogh 2000). These discussions involve the children in justifying their opinions and involve higher order thinking skills. As you listen to what the children say you can assess what the children think. Then you can decide what experiences they will need to move their thinking forward.

### Assessment of skills

Acquiring a set of scientific facts does not make a scientist. It is the scientific approach used to develop the understanding of these facts that is important and in the primary curriculum this is the scientific enquiry strand (Sc1). This strand encapsulates the skills that the children will need to acquire in order to become independent investigators and the assessment of these skills needs to be carefully planned.

It is tempting to think that by engaging the children in doing an investigation we can

assess the Sc1 skills. Indeed, investigations give the children the opportunity to use numerous skills such as:

- Posing questions
- Deciding on an appropriate method
- Making predictions
- Choosing and using equipment
- Gathering and recording sufficient evidence
- Drawing conclusions
- Evaluating the investigation

“Allowing the children to choose their own method of recording can be messy but provides greater insight into what the children can currently do”



Consider a lesson where the teacher has identified the question to be investigated, e.g. which material shall we use for the canopy of our parachute? The children could investigate a range of properties: the strength of the materials, the waterproof nature of them or how they open when dropped and they would use a number of the skills identified above. However, if the teacher demonstrates the method, provides children with limited resources or them a table of results to complete then they are really only using their measuring skills.

To make valuable assessments of what the children really can do the following approach will help.

First, identify which skills the children will require to successfully complete the activity and then plan how each skill can be taught, for example, during the introduction to an activity you can demonstrate the skill(s) you want the children to develop. Then you will need to give the children opportunities to practise the skill so you can observe how well this skill is being used by a range of pupils. To assess if skills have been embedded, children need to be given the opportunity to use the skills in a different context so you can observe the

children and make a summative judgement about the pupils' level.

Another important message about assessment of skills relates to the recording of evidence. If you provide a table for the children to complete you are providing scaffolding to support their understanding as to how data can be recorded, but this gives you very little evidence of the current skill level of the children. Allowing the children to choose their own method of recording can be messy but provides greater insight into what the children can currently do and often provides a starting point for discussion in the plenary or the next lesson.

In this way the children should be able to carry out the investigation independent of the teacher and during the activity the role of the teacher is to observe and question.

It will not be possible to assess all children during the same activity so it is important for the teacher to target particular children to gather more in depth knowledge. It may be appropriate for these children to work together in a group so that the teacher can devote more time to them, or it may be better for the children to be spread around the class with the teacher moving from table to table.

**\* Visit**  
[sciencemuseum.org.uk/launchpadeducators](http://sciencemuseum.org.uk/launchpadeducators) and look for the KS1 activity 'Ear Gongs' for details of this experiment.



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