Assessment and learning

WORKSHOP LEADER'S NOTES

Aims

The activities in this module aim to provide an opportunity for discussion of the role of assessment as part of teaching, and of how planning and the identification of criteria assist in using assessment to help teaching. The involvement of children in their own assessment is also discussed.

Objectives

1. Understanding the value of assessment at part of teaching.
2. Recognition that it is necessary to plan how to assess ongoing work just as much as it is necessary to plan learning activities.
3. Awareness that having criteria in mind for assessment enables information to be gathered and used more efficiently in assessment.
4. Knowledge of ways of involving children in the assessment of their work.

Task B1

This task illustrates the importance of ongoing assessment to reveal a child's thinking and guide teaching.

Organisation: Participants in pairs.

Materials needed: Task B1

Time: Allow at least 20 minutes for the task. After 10 minutes encourage pairs to move on to part (ii) and 20 minutes for plenary feedback

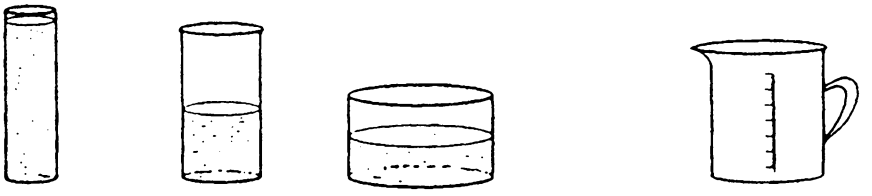
Instructions: Go through the task and tell the participants :

- After reading the episode, imagine that the assessment had ended when the answers were marked and compare that with what happened.
- In part (ii) identify precisely how the extra information gained by questioning the child could be used in teaching.

Task B1

First read this episode

An 8-year-old child was given three containers, A, B, and C, as shown and a measuring jug. The child was asked to label them 1, 2 and 3 according to the amount of water in them, giving 1 to the one containing the most and 3 to that containing the least.



A B C Measuring jug

The child's answer was: A = 1, B = 2, C = 3.
The teacher marked A = 1 as correct but the other answers as wrong.

The teacher was puzzled that only the first answer was correct.

She asked the child: "Why do you think all your answers are correct?"
The child replied: "Because I did the same for all of them, I looked at the height of the water level in each one and numbered them."

(i) Suppose the teacher had not questioned the child to find out why only one answer was correct, what could have been the consequences for the child's immediate learning?
(ii) If you were the teacher in this situation how would you react to the child? Work with a partner and take turns to role-play the child and the teacher. Write down what you think is the best way of reacting to the child.

Plenary discussion

Begin plenary feedback by asking one pair what they saw as the main 'moral' from this tale. Collect responses from others if they have different points to make.

For sub-task (ii) ask another pair to report. Insist on a statement of what the teacher would actually do or say rather than a general indication. Collect alternatives from other pairs. (**Note:** there is more about using assessment information to help learning in Module D).

Points to emphasise

- It is not enough for the assessment to be concerned with the product of work, this will not necessarily reveal the child's thinking.
- The teacher is in a much better position to help children's learning when appropriate formative assessment is used. (Refer to background information for Module A to reinforce the meaning of formative assessment.)
- Asking children to explain their reasoning orally is as much assessment as is asking for written answers.
- This kind of assessment does not come at the end of teaching, just to check on what has been learned, but guides the teaching and is part of it.

Task B2

This task draws attention to the value of having some criteria in mind expressed in terms of what children will be doing when they are using various process skills or displaying attitudes or ideas. It asks participants to consider, before referrng to examples of criteria, what could be assessed in certain situations and then to do the same with criteria in mind. Thus it is important that the criteria (Resource 5) are not distributed before part (i) has been completed.

Organisation: Participants in groups of four to six.

Materials needed: Task B1 and Resource 4. Resource 5 to be distributed after completion of part (i). Sheets of flip chart paper and felt-tip pens.

Time: At least 75 minutes in all. Allow about 20 minutes for part (i) of the task, 10 minutes for reading Resource 5, then another 25 minutes for part (ii), with 20 minutes for plenary feedback.

Instructions: Introduce the task and tell the participants:

- For part (i), read the four episodes in Resource 4 and brainstorm the information that the teacher could obtain by assessing in the ways indicated. Complete the table indicated on a large sheet of paper. Put this on display before starting part (ii).
- Then (and only then) read Resource 5.
- Use the criteria to list the process skills, ideas and attitudes that might be assessed in each episode. Use the reference numbers in Resource 5 for the process skills and attitudes. Present findings in the form of a large chart.

Task B2

(i) For each episode in Resource 4, write down what the teacher would be able to assess using the information (s)he could collect in these situations. Brainstorm the ideas in your group onto a chart like this:

Situation	Information obtainable
A	
B	
C	
D	

(ii) Now consider the examples of criteria for assessing skills, attitudes and concepts of primary children in Resource 5. List the criteria that might be used for assessing in these situations. Complete a chart of this kind:

	Process skills	Ideas	Attitudes
A			
B			
C			
D			

Plenary discussion

Display the charts and allow a few minutes for reading. Look across the displayed answers to part (i). Where it is not obvious, ask the group to explain how certain information could be obtained.

Do the same for answers to part (ii). Compare responses to the two parts. It is likely that there is more detail in answers to part (ii). Ask participants why they think this is.

Points to emphasise

- In all four situations there is a great range of information to be gathered, especially about skills and attitudes.
- Each situation provides opportunities for only a few ideas to be assessed, but they all provide an opportunity for a number of skills and attitudes to be assessed.
- Teachers can use many ways of collecting the information. (Details of these are taken up in Module C).
- Reading the criteria helps in recognising the range of information that could be collected.
- The value of having criteria in mind is felt before making an assessment, not just afterwards in making judgements.
- In practice, to be useful, criteria have to be carried on the head, not written down as a list on paper. There are other practical matters relating to this ongoing assessment that have to be considered. This links to Task B3.

Task B3

At first it seems quite impossible to collect information at the level of detail suggested for all pupils in a class. This task is concerned with matters relating to the practicalities of assessing during teaching.

Finding solutions to these problems requires a further look at what is being assessed. A key points is that in an active science programme, process skills will be used frequently and there will be several opportunities for their assessment. On the other hand, concepts are tied to the particular subject matter in each activity and have to assessed when this is being considered.

Organisation: Participants in groups of four to six.

Materials needed: Task B3.

Time: Allow at least 30 minutes in total for the three parts of task.

Instructions: Tell participants to:

- Work out specific questions for part (i).
- In parts (ii) and (iii) suggest one or two alternatives, indicating whether or not the ideas are based on practice.

Task B3

First read this episode

One week before a test, 7-year-old children are asked to observe a living spider closely and told that the test will be such that they can answer it well if they have observed the spider well. The children will answer orally or on paper (as a picture or using words).

Working as a group:

(i) Write five questions to assess how well the children have observed the spider.

(ii) Imagine you are the teacher. How will you arrange for the assessment to take place? How will you plan the session when the children are giving their answers so that each one can be assessed?

(iii) Suppose the teacher wants to assess children whilst they are investigating some materials. How could (s)he do this with at least eight groups of children?

Plenary discussion

For reporting sub-task (i), proceed as follows:

- pretend you are the child and ask one group to ask you the five questions they have prepared
- answer the questions as well as you can, noticing whether the answer really depended on having observed a spider or not
- after responding to all the questions, discuss any questions that you thought did not depend on observation
- ask other groups to review their questions in the light of the points made.

For part (ii) collect responses from two groups and then ask for any additional points or comments on what has been said. Remembering that the children are aged 7, it is likely that a child's drawings needs to be discussed with him or her. A possible approach is to ask all the children to make drawings at the same time and then, at a later time, to discuss each drawing with the child and to ask probing questions. Older children might help in an assessment of this kind (see Task B4).

For part (iii) collect responses from two different groups and ask for comments from others. Assumptions have to be made about the situation; some suggestions might be feasible in certain circumstances and not in others. Keep the discussion to general strategies. Particular difficulties have to be accommodated in applying the strategies.

Points to emphasise

- When questioning children, it's important to have in mind what you want to assess and to make sure that the questions do require them to use or have used the particular skill or idea.
- The key to solving the practical problems is planning what to assess at the same time as planning the lesson.
- It's useful to think in terms of priorities for the limited amount of 'on the spot' assessment that a teacher can do with a large class. Observation of practical skills has to be done in this way, but fortunately not for all the children at once. There should be several opportunities for this if the children are often involved in practical investigations. Thus the assessment can be spread over several lessons, with focus on one group at a time, as suggested in the background information.
- For assessing ideas, it is usually possible to use a combination of questioning during discussion of their work and setting some written tasks that are designed to reveal their ideas and which can be answered by writing or drawing. (There is more about this in Module C.)
- The children can often help. This bring us to the next task.

Task B4

Involving children in assessing their own work has many advantages for their learning. To obtain the benefits, however, the involvement has to go beyond having children mark their own or each other's answers right or wrong. Taking part in assessment can be a means of positive and helpful feedback to the children, enabling them to understand the learning objectives. All of this requires planning and takes time. This task helps teachers to decide the benefits of spending time in this way.

Organisation: Participants in groups of four to six.

Materials needed: Task B4 (also B3 if not already available) flip chart paper and pens.

Time: Allow at least 30 minutes in total for the three parts of the task.

Instructions: Introduce the task by telling participants :

- For part (i) consider what is desirable and not just what is current practice.
- Part (ii) will mean thinking about real situations.
- For part (iii) consider the circumstances where there are advantages and disadvantages.
- In part (iv) gather ideas are based on practice.

Task B4

(i) In the episode in B3 in what ways might the children take part in assessing their own work and/or each other's work? How might your answer differ if the children were 10 years old instead of 7?
(ii) How would practice have to be modified in very large classes?
(iii) What advantages and disadvantages do you see in children taking part in assessment?
(iv) What examples of children taking a role in their assessment can you give?

Plenary discussion

Ask one group to give responses to (i) and list these on a flip chart. Ask other groups to give ideas which add to the list. For (ii) list advantages and disadvantages on a flip chart, taking points from each group. For (iii) the examples should be taken from practice; avoid going over possibilities gathered in (i).

Points to emphasise

- Involving pupils in assessment provides them with feedback on their achievements, but the more important aim is to enable them to understand the objectives of their learning. Unless this happens, the process becomes mechanical and will not help to motivate learning.
- Avoid children being involved in giving themselves marks and comparing them with others.
- Pupil self-assessment is helped by teachers explaining what sorts of things they are looking for in children's wok and discussing the assessment of it in these terms.
- Children should be given an opportunity to comment on their work, that is, to say what they like and don't like about it and how they might improve it.

Background information

Assessment as an integral part of teaching and learning

There are three important points:

- Opportunities for children to develop and use their ideas and skills and for positive attitudes to be fostered should arise frequently in children's activities. Thus these same activities provide opportunities for assessment of the ideas, skills and attitudes.
- Teachers need to know where children are in their development in order to provide activities which are to help their progress and not be too far out of their reach, nor too easy and so boring.
- It is important to keep in mind that the purpose of ongoing assessment is to gather information which can be used to help learning *at the time*, and which can contribute to a record of performance which will inform longer term planning. Gathering information to be used in teaching is the aim to emphasise, since if it is carried out thoroughly, the creation of a record is a straightforward matter (see Module E). However, the reverse is not true: the collection of information for a record does not necessarily mean that it helps teaching and learning.

Seen in this way, good teaching *requires* assessment to be part of it, and not added on as an after thought. Thus planning for assessment becomes part of planning for teaching.

Planning assessment as part of teaching

Gathering information when the appropriate opportunity is there – and thus avoiding having to set up special tasks – means planning the assessment as part of the lesson planning. The plan should take account of the frequency of opportunities for assessing different aspects and the potential for using the information.

Opportunities (should) arise frequently for children to use process skills. Most science activities should involve children in thinking and doing and thus provide the teacher with opportunities to assess the children's process skills. All activities should involve children in thinking and using most of the process skills. If this is so then it means that it is not necessary to assess all children at a particular time. It is better to observe a small number of children thoroughly throughout an activity so as to achieve a detailed picture of their skills than to attempt to cover a larger number more superficially.

It may take two or three months to complete the observation of all the children in the class, and it will mean that different children are assessed when carrying out different activities. This is not a problem in the context of ongoing assessment for two main reasons.

- Since no comparison is being made between children then, providing the activities give an opportunity for the skills to be used, one activity context is as good as another. (If the purpose were to assign a grade or label to the children then the variation in content of the activities would be a source of error in the results, but when observations can be repeated and the purpose is to help the children's learning, it is not a problem.)
- The skills we are concerned with are ones which are assumed to be generally applicable and so, again, it is the case that one context is as valid as another, given that they provide similar opportunity for skills to be used. This is not to deny the context-dependence of the use of skills, however, and with this in mind it should be emphasised that no one activity alone is sufficient to give a reliable assessment. Observations should be made during various activities over a period of time.

When it comes to assessing children's ideas, the opportunities are far less frequent. Ideas are

linked to the subject matter and particular ideas will tend to be expressed in activities relating to the appropriate subject matter. Thus the opportunities to assess ideas have to be taken when they occur. This means assessing as many pupils as are working on that subject matter at any one time. Fortunately it is far more feasible to use the products of children's work for assessing ideas than it is for assessing process skills. Children's reports, other writing and drawing and other products can be collected and studied after the event. This is not to deny the importance of the context, which should be noted, and the added value that comes if the work can be discussed with the pupils.
Note: The study of specific methods of assessing skills and ideas is the subject of Module C and is not pursued further here.

Involving children in assessing their work

Involving children in their assessment means that they must know what are the aims of their learning. Communicating these aims for science is not easy, but the rewards of successfully attempting it are quite considerable, not only for help in assessment, but the potential for self-direction in learning. Direct communication of complex learning objectives and criteria of achievement is unlikely to be successful. For example, children may not be able to *define* what it means to draw a conclusion from evidence, but at the same time they will be able to do it, to draw conclusions from evidence in the course of their activities. Such things are understood by children through experience and examples.

Ability in self-assessment has to be developed slowly and in an accepting and supportive atmosphere. It takes time to work through several stages before children are able to apply to their work anything like the criteria which their teacher would apply. Teachers communicate what is valued and expected in their comments on children's work. Children pick these up and use them implicitly in judging and making comments on their own work. This being so, it is important to ensure that such comments reflect what is of real value to children's learning.

There are two main strategies which can be used in combination to work towards more explicit discussion of criteria for judging work and using the results to improve achievement. They both take up some class time and this has to be justified in terms of the benefits.

1 Starting from the children's judgement of their work

The process can begin usefully if children from about the age of eight are encouraged to select their 'best' work and to put this in a folder or bag. Part of the time for 'bagging' should be set aside for the teacher to talk to each child about why certain pieces of work were selected. The criteria which the children are using will become clear. These should be accepted and they may have messages for the teacher. For example if work seems to be selected only on the basis of being 'tidy' and not in terms of content, then perhaps this aspect is being over-emphasised by the teacher.

At first the discussion should only be to clarify the criteria the children use. 'Tell me what you particularly liked about this piece of work?' Gradually it will be possible to suggest criteria without dictating what the children should be selecting. This can be done through comments on the work. 'That was a very good way of showing your results, I could see at a glance how quickly each plant grew', 'I'm glad you think that was your best investigation because although you didn't get the result you expected, you did it very carefully and made sure that the result was fair.'

Through such an approach as this children may begin to share an understanding of the objectives of their work, and will be able to comment usefully on what they have achieved. It then becomes easier to be explicit about further targets and for the children to recognise when they have achieved them. This then turns into the second strategy.

2 Starting from the teacher's objectives

This can start in a simple way as when a teacher might say, 'I will be looking for... in your work today'. Following on from this it may well be a good use of learning time to discuss different ways of going about a task to achieve what the teacher wants and what the children think would be the best way to tackle something and why. A class of 9-year-olds readily came up with the home truth (about a project on the planets) that 'if we just copy the book, we don't really understand it' and proposed that they should read first and then put down what they thought. The teacher added to this, 'Yes, then you will also be more careful to understand what you read in a book and that will help you whenever you use books to find information'.

It is not easy for anyone to stand back from specific learning to examine the *process* of learning itself and young children are not often able to do this, but a gentle move in this direction can help them realise the point of what they are doing. Teachers of older pupils can more explicitly share with them the criteria they use both in assessing practical skills and marking written work. One science teacher, for example, did this by writing his own account of a class investigation and distributing copies for the pupils to mark, looking for particular features. It led to lively discussion and a keener understanding of what was expected in their own accounts.

Benefits for the children's learning

Self-assessment, when children are judging their own work, gives them immediate feedback on what they have achieved. They do not have to wait for their teacher to tell them or for their work to be marked.

The communication of criteria for judging their work, by one strategy or another enables them to see what they should be aiming for, i.e. to realise implicitly or explicitly the learning objectives.

Information of this kind also helps in encouraging children to share responsibility for their learning. For this they have to be aware of what they are expected to achieve in their work.

Sharing responsibility for learning necessarily means that the teacher has to be aware of how the children feel about their work. Interest in children's feelings and views on their learning has to be sincere. Children are not taken in by the superficial interest of their teacher, for it will be betrayed by manner and tone of voice as well as by whether anything happens as a result. A genuine interest creates an atmosphere in which children's own ideas are encouraged and taken as a starting point, where effort is praised rather than only achievement, where value is attached to each child's endeavours. In this atmosphere, a child who does not achieve as well as others will not be ridiculed. The range of activities available makes allowances for differences in the ability of the children, and the teacher's interest and approach results in the involvement of children in their work and their own learning.