

SOME CLASSROOM PROCEDURES

January, 1990

The following are extremely brief descriptions of classroom procedures which we have found useful in PEEL. For most procedures these descriptions cannot include much of what a teacher who plans to use them would like to know; in a number of cases, (e.g. B.8 - Challenge of Ideas or F.12 - Keeping a Reading Log) it is extremely difficult to meaningfully describe them in only a few lines. For people who have been involved in the project we feel this list is a useful reminder of what can be done. For those who have not, it offers direction about which procedures could be useful. More detailed descriptions and advice will be available in our second book.

Each procedure has been placed in one of seven groups which reflect different aspects of learning. This is not intended to be restrictive; a number of procedures can be used for several different purposes as is indicated at the end of each group.

Group A: Procedures for building understanding of subject content and skills.

A.1 Concept mapping

A set of items (usually less than 10) are arranged on a page and the student considers each term with ALL of the others in turn. Those that are related in any way are linked by a line with the link written on the line. Most terms are linked to a number of others. Terms can be concepts, events, objects, laws, themes, characters, emotions, classroom activities or anything else which promote useful learning.

A.2 Linking very different parts of the work and subjects

- e.g. - which of the problems in exercises 8 and 9 is most similar to what you will do in this prac;
- can you find a link between page 8 and page 83.

A.3 Constructing grids from row and column headings

Used to focus students' thinking on relevancy, what the question asks, organizing their ideas and what gaps (if any) there are in their understanding.

Task: 'Show a relationship between the row and column headings. Try and write something in every cell.'

e.g. To help answer the question 'In flowering plants the processes of germination, growth, flowering, and fruiting involve changes in both structure and function. Discuss'. The student construct and complete.

Flowering Plant Processes	Some Structural Changes	Some Functional Changes
Germination		
Growth		
Flowering		
Fruiting		

This task is related to concept mapping, but the emphasis is on systematic linking of all combinations of two sets of terms/themes/ideas/concepts/conditions/characters etc.

A.4 Selecting information from grids

The students are given a grid of (say 12) cells each of which already contains a piece of information; a piece of data, a law, a proposition. Unlike A3 there are no row or column headings. The students have to select which cells contain the correct or relevant pieces of information for a series of questions.

- e.g. - 'Which cells are relevant to this essay topic';
 - 'Which cells contain the data needed to solve this problem'.

A.5 Concept attainment (What's my rule?)

The teacher puts up one positive and one negative exemplar of a concept which is to be the focus of the lesson but which s/he will not identify. The students have to work out what the concept is by deducing the criteria (or rules) the teacher is using to define it as s/he (randomly) puts up further positive and negative exemplars, asks 'is this an example of what I am thinking of?' and then (without explanation) puts it in the appropriate list.

Some concepts; 'solid', 'parallelogram', 'iambic pentameter'.

A.6 Refinement of new terms

The class works towards a definition of a new word (e.g. fret-saw) which defines/includes fret-saws and excludes all other saws.

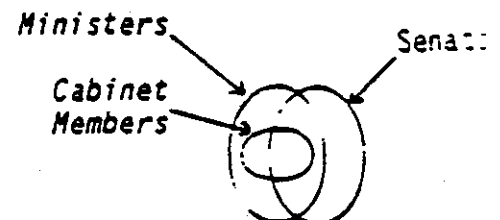
- e.g. T- 'Can someone give me a first attempt at a definition?'
 S₁- 'fret-saws can cut around corners'
 T- 'Good, what question should we ask now,'
 S₂- 'Whether any other saw can cut around corners' etc. etc.

A.7 Comprehensive review of new terms

All the new/technical terms in a unit are listed and the task is to complete 'definition' and 'application' columns. This means there is a focus on the differences and links between the terms.

A.8 Venn diagrams

These show the relationships between groups of objects or people. To construct a venn diagram such as the one shown requires the answering of a string of questions such as 'Are there any senators who are ministers but not members of cabinet?' (yes)



A.9 Change the organizing principle

e.g. 'rewrite these notes on the respiratory, circulatory, digestive and excretory systems so that they focus on the idea of interchange of substances between systems' or 'these notes on early Australian History are organized chronologically, rewrite them thematically using the following themes ...'

A.10 Translation activities

These can take many forms but in all of them the student has to translate information presented in one form into another. Students may translate notes into diagrams; maths laws into poetry. This gets students to think about what they know and do not know, e.g. explain photosynthesis using only pictures..

A.11 Role playing

This can take many forms, but we are particularly referring to versions which require the students to construct roles which illustrate essentially unobservable processes such as perfume molecules leaving a bottle of perfume after the stopper is removed.

A.12 Unusual creative writing

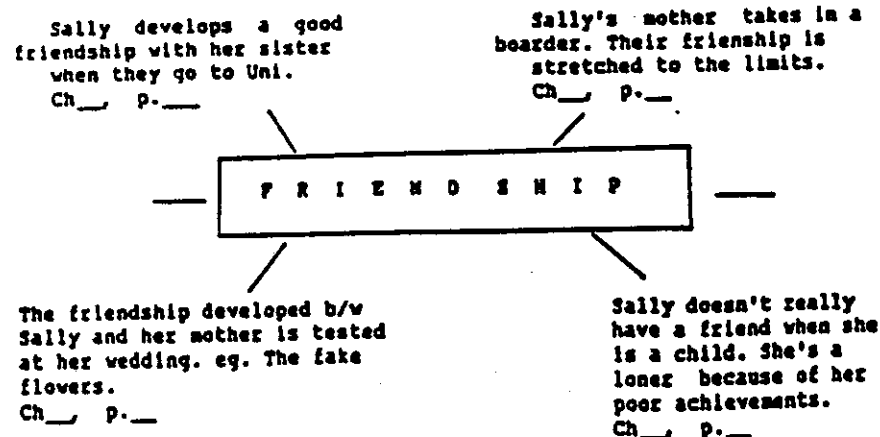
That is writing which personalizes and/or makes more concrete abstract or normally invisible things or processes, e.g. 'A day in the life of Betty Blood Cell'. — *EMPHASISE STORY MUST INCLUDE ACCURATE SCIENCE CONTENT*

A.13 Theme charts

These have been used by English students to identify, find examples of and evidence for the main themes in a novel.

Step 1. Generate a list of themes using 'What is this book about?'

Step 2. As a class take one theme and create a theme chart; this has examples and references to evidence.



Step 3. The students each create their own theme chart on another theme which interests them.

A.14 Challenge the right answer

After an explanation has been discussed, encourage students to explain parts of it that seem implausible. The instruction given to students would be: "You have to find some aspect of the explanation that you find difficult to believe".

A variation useful in History is to challenge how people behaved in the past.

Also useful for this purpose:

Interpretive discussions (B.1), Taking notes from a jumbled summary (B.3), Small group discussion (B.4), Predict, Observe, Explain (B.9), Sweller questions (E.9). Work out what you need to find out (F.1).

Group B: Procedures for retrieving, clarifying and restructuring students existing views and for extending school knowledge to new situations.

B.1 Interpretive discussions

A discussion where the teachers goal is not to focus on the 'right' answer, but to get as many students as possible retrieving, presenting and defending their explanations. This means judgement is delayed. Student to student debate may lead to some movement to one view or may lead to clarification of the arguments for competing views. The teacher acts as a boundary umpire and facilitator.

B.2 Summarize a discussion with diagrams

At the end of a discussion the students have to summarize the competing positions with diagrams - and then make a commitment to one.

B.3 Taking notes from a jumbled summary

During a discussion the teacher deliberately randomizes the way s/he puts points on the board. At the end of students have to turn this into an organized set of notes.

B.4 Small group discussion: - each group has to reach consensus and report on their views about some situation, idea or issue.

B.5 Written probe of prior views (using the kinds of cards used in clinical interviews).

- e.g. -- 'what do you think are the forces of a golf ball while it is (various points of its flights are given).'
- 'which of these pieces of writing would you classify as a piece of poetry?'

B.6 Reinterpreting familiar terms

The focus is on getting more precise meanings and differences between terms that are already commonly used by students.

e.g. a discussion about the difference between hill/mountain; weather/climate.

B.7 Completing statements from the stem

e.g. 'Paragraph are ...
Paragraphs contain ...
Paragraphs are for ...'

Used as a way of clarifying students views BEFORE presenting the teachers views.

B.8 Challenge of ideas

The class has agreed that there are two or more conflicting models/explanations held by the students. Activities are planned and run to test the power of the competing explanations.

B.9 Predict, Observe, Explain (P.O.E.)

The students are presented with a situation and asked to make a written prediction, with reasons, about what will happen next or when a particular action is taken. The action is taken and they record what (they perceived) did occur. If this was different from their prediction they try and give a revised explanation. e.g. 'we have one light bulb connected to a battery, what do you think will occur when we add a second bulb next to it?' (Some alternatives are given). It is usually crucial that the teacher does NOT praise correct predictions or reward them in any way.

B.10 Link-ups

The students have to construct links between the school content and their personal lives e.g. (TASK) 'How many links can you find between what we have learned about the Vikings and your personal life?' (one link) 'Vikings liked to tell and listen to very long stories called sagas, this is like us watching (a Soap Opera) each evening.'

B.11 Return to prior views

The students have kept a record of their views/explanations they held at the start of a topic (e.g. their response to A1 or B5). Late in the unit they return to these and (on paper) describe if, how (and perhaps why) they have changed any of them.

Also useful for this purpose:

Concept mapping (A.1), Venn diagrams (A.8), Promoting and using students questions (C.3), Prior warning of poor learning tendencies (F.5), Keeping a reading log (F.12).

Group C: Procedures to improve communication, participation, collaboration and negotiation.

C.1 Communication sheets

Students complete these at the end of a lesson, the format varies but they include the opportunity for writing queries/questions/problems to which the teacher makes a written response.

C.2 Encouraging students to admit to not understanding

Three suggestions

- a) Ask the class to close their eyes before asking 'Hands up those who don't understand this yet?'
- b) Put them in small groups where each group will identify and report on what they are finding difficult.
- c) Give lavish praise for students who are 'intelligent enough to realize that they don't understand point x'.

C.3 Promoting and using students questions

This involves a whole approach to teaching. It includes training students in how to ask good questions and procedures for stimulating a lot of questions e.g. - everybody try and write two questions one beginning with 'why does ...' and one with 'what if'.

C.4 Pinning questions on the wall

Each student writes two questions he/she wants answered, on a card which is pinned on the wall, and taken down (over the next few weeks) only after it has been answered. The teacher may say 'now we will deal with Linda's question' or may ask 'whose questions have been answered today'.

C.5 Student select their own problems

The teacher gives the student responsibility for selecting the range (and perhaps amount) of homework done e.g. 'Choose 8 examples which you think you need to do and which cover the range of ideas/problem types'.

C.6 Negotiating content and activities from students questions

There are obviously many ways of negotiating, but this one begins by generating a long list of student questions, (based on some initial stimulus) and then collapsing and sorting these into a structure for future work.

C.7 Modify the task as you go

Students set off with a preliminary list of questions to research on some topic. However this list is not final. After they have begun they must set further questions based on what they have learnt so far.

C.8 Students monitoring other students good learning behaviour

A rotating monitor uses a checklist during lessons to monitor the rest of the class or the rest of a small group.

C.9 Comments on comments

This is intended to get students to think about the comments teachers write on their work. Students are asked to write a comment in response to the teacher's comments, explaining what the teacher meant.

Also useful for this purpose:

Challenge the right answer (A.14), Interpretive discussions (B.1), Small group discussions (B.4), Challenge of Ideas (B.8), Link-ups (B.10), Work out what you need to find out (F.1), Assessing question asking (G.1), Students set the test (G.4), Negotiating a checklist/marking scheme (G.6).

Group D: Procedures to improve the processing of written notes or text.

D.1 Writing on the reading

Students 'write all over' a piece of text in a 'dialogue' with the author: - personal reactions, questions, links and opinions.

D.2 Students answer questions from their own summaries

Give the students a resource, they make their own summary from this, then remove the resource and give them some questions/tasks to be answered from their summaries.

D.3 Inserting sub-headings

Students are given notes without any headings and have to construct a sub-heading for each program and/or headings for groups of paragraphs.

D.4 Recalling sub-headings

'read page 9' ... (30 seconds) ... 'turn it over ... write down the heading and sub-heading'.

D.5 Linking sub-headings

Students have to link the (existing) sub-headings in as many ways as possible.

D.6 Unjumbling notes

The students are given a set of sub headings and (jumbled and cut up) the paragraphs which fit under them. They have to assemble the whole using glue.

e.g. Sedimentary Rocks: Description
Diagrams
Examples
Igneous Rocks: Description
etc. etc.

D.7 Find the new words or ideas

'read page 9 and list the new words (or) the ideas which are new'.

D.8 Link examples to principles

e.g. 'Why are there 4 examples quoted on page 11? Do they illustrate different points? Link each of them to the principles on pages 8-10.'

D.9 No explanations without questions

'Read pages 9 and 10, all I will do after that is respond to your questions', if there are no questions we will move on .'

D.10 Students set the questions

The students have to read some notes or a piece of text and set (say) 5 questions which would test the understanding of another student who had to read the text.

Also useful for this purpose:

Concept mapping (A.1), Linking very different parts of the work (A.2), Venn diagrams (A.8), Translation activities (A.10), Role Playing (A.11), Keeping a reading log (F.12).

Group E: Procedures to improve numerical problem-solving.

E.1 Where is it wrong

The students are given a series of worked solutions, most of which have an error. The task is to find and circle the incorrect step, say why it is wrong and rewrite it correctly.

E.2 Problem classification

'Don't DO these problems, SORT them'.

E.3 Routinely setting unsorted problems

Wherever possible the teacher avoids setting problems in sets of the one type. This ensures that students usually have to think about what kind of problem No. 15 is before leaping into a solution.

E.4 Building on old procedures

The students consider two different, but related problems and the procedures necessary to solve them, the task focuses on identifying both the common and different aspects of the procedures. e.g. This (new) problem is related to those in Exercise 9.1, start solving it in the same way and find the point where we will need to change the procedure.

E.5 Assembling complete solutions from sub-procedures

Near the end of a topic, a set of all the sub procedures (or steps) which have been used is assembled and then the task is to take a range of problems and select and sequence the sub-procedures needed to solve them.

E.6 Reversing the task

This has several forms.

e.g. 1 The students are given an example of a familiar problem but the numerical values of one (or more) pieces of the data are omitted and the answer is given. They have to find suitable data or sets of data.

e.g. 2 The students are given a sequence of buttons pushed on a calculator and asked for the problem which was set,

$$\boxed{29.47} \quad \boxed{x^{1/y}} \quad \boxed{3} \quad \boxed{=} \quad \boxed{1/x} \quad \boxed{x} \quad \boxed{1.31} \quad \boxed{=}$$

was

$$\sqrt[3]{\frac{1.31}{29.47}} =$$

E.7 Constructing different questions with the same data and answer

This is a procedure to encourage students to generate their own problems involving calculations.

e.g. Given the density of ethanol, heat of combustion and the equation, construct three different questions all of which have the answer 'one cubic decimetre'.

E.8 Give out jumbled answers with the test

e.g.: Factorising quadratic equations test, included the correct answers and a couple of wrong answers. Students had to match up the questions with the correct answers.

E.9 Sweller questions

'Use this data to find out/calculate as many things as you can about this situation'.

e.g. - 'How many things about this can of beans can you calculate?'
 - 'What can you deduce from this map' (of the Norman Conquest of England).

E.10 Find another way

The task is to find two (or more) ways of solving problem x.

Also useful for this purpose:

Selecting information from grids (A.4), Prior warning of poor learning tendencies (F.5), Crossing out unnecessary data (F.6), Structuring thinking (F.13).

Group F: Procedures to train students to monitor and control their own learning.

F.1 'Work out what you need to find out'

The students have to learn to use a new piece of equipment e.g. a photographic enlarger or a microscope. Rather than begin with a set of labels and functions of parts the students observe and/or explore the machine in use. Then they see how many blank labels and functions they can fill in on a diagram; What do they already know? What do they need to know? How will they find this out? Further exploration? Ask?

A variation of this is to let students attempt (expecting only limited success) a task (e.g. a music rehearsal) which normally requires a lot of explanation or guidance. From their trial and errors they refine their procedure.

F.2 Topic and task questions

e.g. 'What do you think the main task was today?'
 'Why do you think we had to do this?'
 'What links can you see between today's lesson and yesterday's lesson?'
 'What do you think was the main point we dealt with today?'

One of these can be included on a Communication Sheet or set in other ways. It is crucial to continually vary what is asked.

F.3 Sort out jumbled instructions

Before they start a task, the students are given an envelope containing (6-8) instructions on separate slips which they sort out and glue together, in the correct sequence.

F.4 Deduce the practical design from limited information

e.g. given the diagrams, title or equipment and goal only, students have to work out an appropriate experiment.

F.5 Prior warning of poor learning tendencies

Immediately prior to a situation where a teacher predicts many students will display a poor learning tendency, s/he describes it to the students, warns them, and structures events so that it will be clear to the students whether (or not) they have in fact, displayed the behaviour. e.g. 'I predict that many of you will include irrelevant information when you answer this question, because you won't read the question properly'. It is absolutely essential that this procedure, and the next one, are handled in a very supportive way.

F.6 Dirty tricks

The teacher sets out to show students how passively they learn by setting a task which they should recognize as nonsense, unintelligible or completely unnecessary. e.g. copy out these [two paragraph of nonsense].

F.7 Crossing out unnecessary data

Students are given more information than they require to do a problem or a list of more measurements than they will need to make accurately in a prac. They have to prune the list.

F.8 Identifying answerable questions

Part way through a topic, give a whole lot of questions and the task is for students to decide if they have covered the work and which questions can they do.

F.9 Weekly progress sheets

A checklist of 'how I am going' on an extended assignment. The student has to identify and report on what has been done and what will be done next, and any difficulties. Its purpose is to help the student monitor and plan their program.

F.10 An 'Open Revision Sheet' test

Students are told they are to construct a revision sheet of (say) no more than two sides, which can be taken into the test. The length of the sheet should be such that the students need to summarize substantially.

After competing the test they hand in their revision sheets and the test. Students find problems with their revision sheets and discussion leads to discovery of how to improve and prepare them. Another test may be given using the new revision sheets.

F.11 Focus on research skills

Students are required to write down some specific questions they would like to find out the answers to. They are required to use the library and other resources in order to develop the skills required to find out this information. The assignment stops short of finding and writing answers to all the questions. Instead it requires the students to report on some of the processes they have gone through.

e.g. Students report how they searched for information. "I have looked up these words in the index of these three books."

Other skills which can be focussed on include:

- using tables of contents and/or sub-headings to find information;
- synthesizing data from two or more sources;
- keeping track of useful references;
- deciding IF a paragraph contains part or all of the answer to a question.

F.12 Keeping a reading log

This is a journal kept by the students as they read a novel, play or poem. As well as recording anything the students finds useful. A wide range of tasks can (and should) be rotated; personal reactions, speculations as to what will happen next, or general points the writer is trying to make, links to early parts of the work, to general themes, to other works etc. etc.

F.13 Structuring thinking

The teacher 'unpacks' what an expert does on a high order task such as analysing a poem or solving hard problems and gives the students a set of steps to help them carry out these complex tasks. It is essential to generate a need for this set of steps both before and after presenting it.

F.14 Assignment checklists

Completed before handing in an assignment to help avoid Premature Closure.

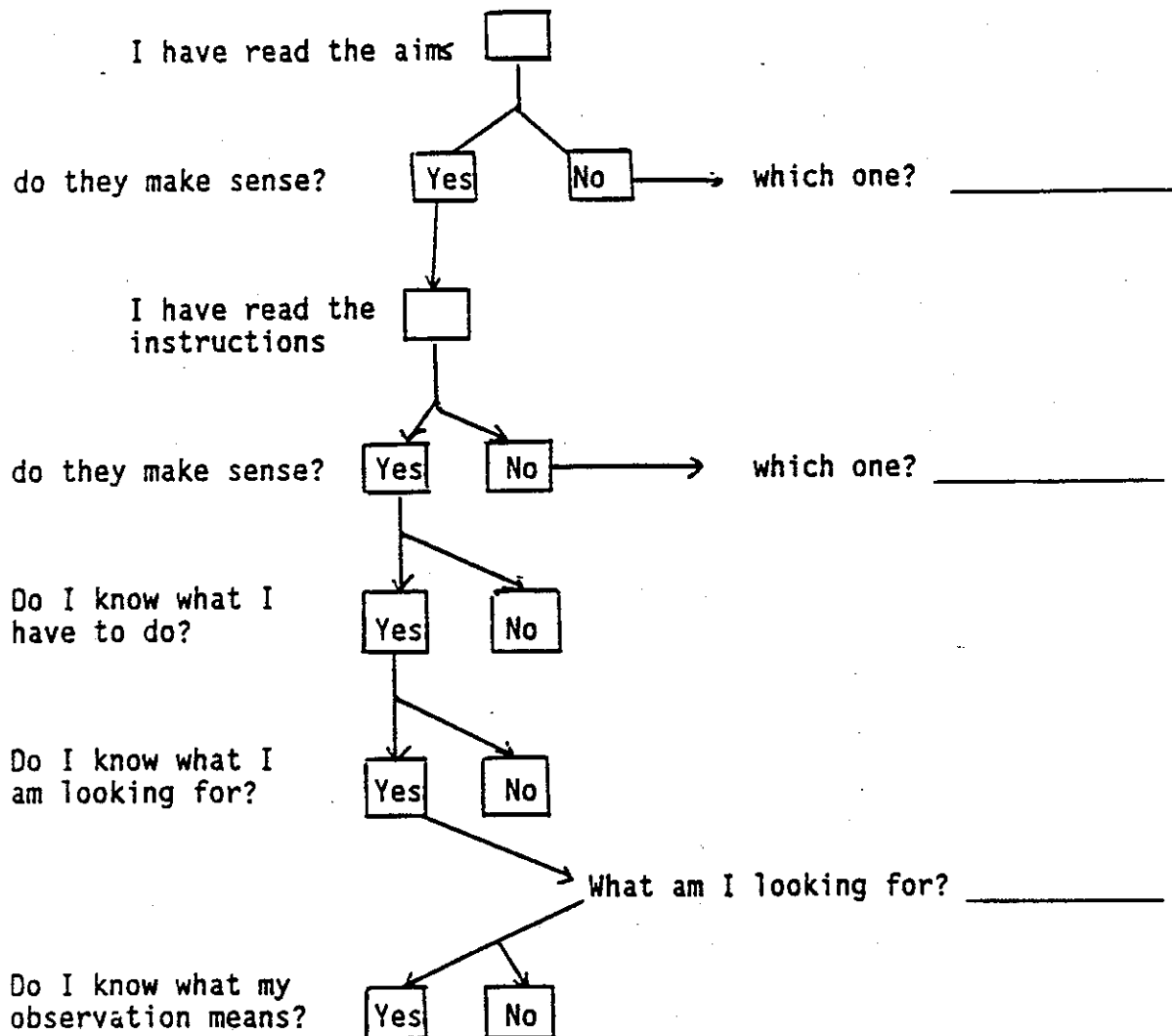
e.g. 'I have checked that I have answered every part of every question'

'I have quoted results in the form required'

'I have included a list of references etc.'

F.15 Use of flow chart

This is (currently) an untried procedure where students are given class time to fill in a 'get stuck' form, for use in the library or in the normal classroom. Students tick the appropriate box and may ask the teacher only if they have ticked all the boxes.



F.16 Question-answer analysis

This procedure focuses on the learning behaviour of how the students went about answering questions. Students are given a question which they are required to answer on a piece of paper. The teacher collects all the answers and writes the question and answers on one large sheet of paper. The class discusses each answer by looking at how the student came about answering the question in that way. The class analyses each answer by looking at the different interpretations of the question, the length, relevance, completeness as well as errors of content.

F.17 'What I did wrong' checklists

These are completed after each of several pieces of work. Their aim is positive - to help the students identify patterns - things which they consistently fail to attend to do poorly.

F.18 Students maintain their own report

After each test or piece of work is returned, the students (in pairs) discuss their work in terms of trouble and success and write an addition to an on going (and hence hopefully changing) report e.g. 'I am good at _____ but I do not understand _____'. This is kept by the teacher and given out before and after each set task as well as any other time the student wants to. The students know the teacher will use this to write their end of term reports. Some teachers have included a teacher response column.

F.19 General learning checklists

These are useful for classes who are ready to move to gaining an overview of good and poor learning. They are a comprehensive checklist of a range of good learning habits or behaviours or self questions. The student selects the ones relevant to the current lesson and then decides if they have or haven't displayed or used them.

Also useful for this purpose:

Selecting information from grids (A.4), Written probe of prior views (B.5), Return to prior views (B.11), Communication sheets (C.1), Student select their own problems (C.5), Students monitoring other students good learning behaviour (C.8), Comments on comments (C.9), Find the new words or ideas (D.7), No explanations without questions (D.9), Monitoring questions on tests (G.3), Evaluate the sources (G.10).

Group G: Assessment

G.1 Assessing question asking

This is an attempt to give credit to the tentative, explanatory, hypothetical and critical language so essential to a good classroom.

A proportion of each terms marks (say 10%) is given for (or one of each terms work requirements involves) students asking reflective questions; e.g. those which challenge someone elses ideas or link to another experience. Questions can be written, but oral questions must be assessed on the spot. One approach is to keep a class list handy and allocate marks at the time depending on the quality of the question.

G.2 Open book reflective thinking test

The students, in open-book test conditions select (say) 5 important or useful new things they felt they learnt (on this topic), and explain why they are important or useful.

G.3 Monitoring questions on tests

These are questions inserted in a test which in fact simply remind the students of some aspect of monitoring which they should have carried out. e.g. 'Have you checked the units required for each problem?'

G.4 Students set the test

A small group activity, each group has to set one or more sections of a test which will sample all the work covered at an appropriate level of difficulty. This test is refined (if necessary) and used.

G.5 The students all set a test

Every student sets a test on a topic and these are then distributed randomly, done and returned to the author for marking. This procedure requires and generates careful initial discussion on depth, breadth, skills being assessed, question formats, marking schemes and the role of the teacher. This could be a take-home test, or an open or closed booklet.

G.6 Negotiating a checklist/marking scheme

A task is set (whether by negotiation or not) and then the teacher raises the question of what should be looked for in assessing it. The goal of the discussion is a checklist for both the students and the teacher to follow. This gets students thinking about aspects they often overlooked

e.g. '- is the language and style appropriate to the intended audience'

'- is the conclusion justified from the reported results'

G.7 Students assess their own answers

This is used where marking is not entirely objective (i.e. students have written answers in their own words). They mark their own work by using a 'guideline to the answers' and a marking scheme.

e.g. 'Your answer must make these three points ____, ____, ____.'
Working in pairs, students decide how well their work meets the criteria and assign their own marks.

G.8 Make marks formative, not summative

The student's work is marked and they are given the opportunity to go back and respond to the teachers comments and improve the work, which is handed in and remarked.

G.9 The super delayed test

Give a test on much earlier work (e.g. a unit from the previous year). The students do it open book in small groups.

G.10 Students evaluate the sources

As part of the assessable task in research investigations the students have to evaluate the different sources available in terms of their value for the students investigation. A number of criteria can be used.

G.11 Discuss your answers

The students do a test (or some other assessment task) and then defend/discuss their answers in a small group. Then they have the opportunity to change their answers if they want to. Clearly the task should not involve short objective answers.

Also useful for this purpose:

A number of earlier procedures can be used for assessment purposes, remember that this may mean they cannot simultaneously be used for other purposes. These include concept mapping (A.1), Linking very different parts of the work (A.2), Constructing Grids from Row & Column headings (A.3), Venn Diagrams (A.8), Translation activities (A.10), Unusual creative writing (A.12), Modify the task as you go (C.7), Students answer questions from their own summaries (D.2), Where is it wrong (E.1), Constructing different questions with the same data and answer (E.7), An 'Open Revision Sheet' test (F.10), Question and Answer Analysis (F.16).

For further reading and a more complete explanation of each procedure see:

Learning from the PEEL Experience (1992)

J Baird, J. Northfield (Eds)

Monash Univ. Printing Services