



Pedagogy and Practice: Teaching and Learning in Secondary Schools

Unit 16: Leading in learning



Creating effective learners

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How to use this study guide

Leading in Learning refers to a systematic programme for teaching the five National Curriculum thinking skills. It has been developed as part of the Key Stage 3 Strategy's support for whole-school improvement, and will be available to schools from February 2005. This study unit draws on the *Leading in Learning* approach. The techniques suggested are tried and tested; they draw on both academic research and the experience of practising teachers.

By working through this guide, you can build your teaching repertoire step by step, starting with strategies that are easy to implement and moving on to those that will help pupils develop their skills still further. The unit contains 'reflections', to help you reflect on an idea or on your own practice, as well as practical tips and tasks to help you consider advice or try out strategies in your classroom. There are case studies to exemplify particular points, a summary of the research and some suggestions for 'next steps' and further reading. The final page invites you to reflect on the material and to set your personal targets for the future.

You can work through this unit in a number of ways:

- Start small; choose one class to work with. Ask another teacher to help by talking through what you intend to do and to act as a mentor.
- Work with another teacher or group of teachers who teach the same class. Work together on developing your approach to teaching thinking skills. After three weeks compare notes. Discuss which strategies are the most effective and why.
- Find someone to pair up with and team-teach. Design the tasks together and divide the role of teacher in the lesson between you.
- Work with a small group of teacher-researchers within your school. Use the guide to help you focus your work as a professional learning community. Record successes in your CPD portfolio.
- Identify sections of the unit that are particularly relevant to you and focus on those.

There is space in this study guide for you to write notes and responses to some of the questions, but you may also find it helpful to keep a notebook handy. For some tasks, you might want to make an audio recording or video of yourself in action so you can review your work more easily. You could add this, along with any other notes and planning that you do as part of your work on this unit, to your CPD portfolio.

The evidence of work you gather in your portfolio could count as points towards accreditation of an MA, or could support your application for membership of a professional body, such as the General Teaching Council of England (GTCE). It could also be used to support an application to reach threshold or Advanced Skills Teacher status.

Leading in learning

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Introduction

Most teachers would support the idea that pupils should leave school not only with good examination results to open the gates to employment or higher education, but also equipped to be well-motivated learners. As such they would be able to:

- organise themselves;
- set goals or make plans;
- identify, find and use resources and sources of help;
- collect and analyse information;
- generate ideas;
- reach conclusions or produce a product;
- review or evaluate the outcome.

Through this process they would be able to plan, monitor progress, refocus where necessary and reflect on the experience. In new learning episodes they would be using knowledge from past learning and they would have confidence in themselves, their ability to work with others and a thirst for learning. This capacity for lifelong learning would not only characterise their education and work-life but pervade their social and family life. Not many pupils attain this profile.

Common issues

Recent studies show that pupils in England tend to see education in very utilitarian terms – you go to school to get qualifications in order to get a job or go to college or university. Pupils don't have a clear grasp of learning as a process that can be developed and applied.

Part of the problem is a lack of a precise, common language for considering thinking skills and learning capabilities, which are important to all subjects. Even where teachers are aware of the problem, most feel that they have not got time to address it because of content that has to be 'got through'. The curriculum becomes, therefore, the experience of 'doing' 11 or more independent subjects which do not add up to a coherent whole. Some consequences of this are as follows.

- Plenaries are rushed in the pursuit of coverage and the final plenary is usually reported to be the weakest part of common lesson structures. As the plenary is the opportunity to draw out more general learning, its weakness often means that subject content remains the dominant theme of lessons.
- Pupils do not readily make connections between lessons (within or across subjects) or transfer their learning.
- Pupils are placed in different groupings for different subjects with different teachers, and therefore do not build up coherent relationships or norms as a class and do not have common learning experiences upon which they can all draw.

Resolving the issues

In the most general terms many schools have made attempts to tackle these problems. Often whole-school initiatives related to learning are an expression of such concern. So projects which focus on accelerated learning, learning styles, CASE (Cognitive Acceleration through Science Education) and building learning power address such issues. The *KS3 Learning Challenge* (Ref. DfES 0088-2004) is also relevant to these concerns.

It is important that a structure is used to bring coherence to the curriculum and that this is communicated to pupils.

Teaching with a high level of challenge is a vital ingredient. Learning that demands higher-order skills, problem solving, collaborative learning, critical and creative thinking is necessary to draw out significant transferable skills. It is in such teaching that one is likely to find the threads that connect subjects.

The teaching of plenaries needs to be improved. Pupils have to develop the ability to think and talk about learning so that they are aware of not only what they have learned but also how they have learned it. This cannot be done every lesson but it needs to be a common feature of each pupil's learning career.

Perhaps, above all, teachers benefit from support at the whole-school level that helps them develop their knowledge and practice through:

- planning lessons collaboratively;
- watching others teach;

- being coached;
- gaining access to theoretical ideas which can help them understand and develop their practice.

Task 1

Reflecting on your school

20 minutes

Do you recognise these issues in your school?

How are they being addressed?

Sometimes people reinvent the wheel. To avoid this:

- informally ask around to find out which departments or individual teachers are interested in teaching thinking skills and which have developed experience and expertise;
- more formally consult senior managers with responsibilities such as Curriculum, Teaching and Learning, and Professional Development to build up a profile of interest and expertise in thinking skills across the whole staff. Don't make too many assumptions as there may be Newly Qualified Teachers or teachers nearing retirement who should be included.

1 Making a start

This section contains two tasks that can be done in either order. They are valuable because they can provide some first-hand experience which will help in building further understanding in the rest of the unit. From the response that you get from pupils you can begin to judge whether there are already important foundations in the school or whether you are starting from scratch.

Task 2

Getting the pupil perspective

30 minutes

Much of the research evidence suggests that pupils do not develop a rounded view of what schools and education are for.

Select a class, perhaps in Y7 or Y9, and interview a small group (3–4) of pupils centred on the question:

What do you learn in school?

Their first response will probably be a list of subjects. If pressed further they may mention particular topics and possibly issues raised by PSHE, assemblies and extra-curricular activities. With more probing they might begin to discuss how they learn. Some further questions that might help are:

In what subjects do you learn the most?

Do you learn anything about how you learn?

Are there any connections between what you learn in different subjects?

Task continues

If you need to dig hard to get to this layer, and if they find it hard to talk about it because of a lack of language or familiarity with the topic, then the more likely it is that they have not been affected by 'teaching thinking' approaches.

It is also possible that they might have some 'buzz' words such as Visual, Auditory and Kinaesthetic Learning and different kinds of intelligence. In this case see if anything lies behind it.

At this point you may wish to watch [video sequence 3a](#), in which pupils discuss what helps them to learn ([unit 3](#)) and [video sequence 19a](#), in which pupils and teachers talk about learning styles ([unit19](#)).

Task 3

An early classroom experiment

1 hour

If you do not have any experience of teaching thinking skills then you might try this idea.

Odd One Out is a very simple strategy. Provide pupils with a series of 'sets' of three or four important words in the topic you are teaching. Ask them to choose the Odd One Out. Emphasise three things:

- they must have a reason for their choice;
- in addition to saying why one is different they must also say what the others have in common;
- their answers should relate to understanding the topic – this helps avoid tangential answers such as 'the Odd One Out has four letters and the others have six'.

Make some of the later sets more open or ambiguous so that pupils might generate alternative answers. In some subjects you might prefer to use photographs, pictures, sounds/music or actions instead of words.

Appropriate objectives for such an activity might relate to understanding important words, concepts or terminology in a topic.

2 What is meant by teaching thinking skills?

There is a variety of approaches to teaching thinking skills that can be broadly related to the type of thinking that is being focused on.

- 1 **General thinking ability or information-processing capacity** (this should not be equated to information processing as a skill): This is the level targeted by CASE (Cognitive Acceleration through Science Education) and CAME (Cognitive Acceleration in Mathematics Education). Both aim to enable pupils to handle more complex thinking or 'formal operations'.

- 2 **Specific thinking abilities:** This is the approach addressed in the five National Curriculum thinking skills. This approach is dependent on developing reasoning, creative thinking and evaluation through collaborative work and exploratory talk. The thinking that is generated by the talk between pupils gradually becomes internalised by the individual, so that the group's collective thinking becomes their own. This process is greatly assisted if thinking and learning are identified, labelled and explored. This approach is strongly influenced by the work of the Russian researcher Vygotsky.
- 3 **Metacognition:** This can broadly be described as 'thinking about thinking' and being critical in the ability to plan, monitor and regulate thinking processes. This approach is part of the first, builds the second and requires that pupils periodically stand back from their work. Metacognition is highly dependent on developing a language about thinking and is central to the process of transfer of learning (see [unit 2 Teaching models](#)).

These approaches are not competing theories: in fact they can complement one another extremely well. This unit and the *Leading in Learning* initiative focus on the five National Curriculum specific thinking skills and metacognition to encourage transfer. Pupils' disposition and attitudes towards learning are likely to be affected and these will probably be the overt signs of the impact of developing thinking skills.

Although not an approach to teaching thinking skills, it is extremely important to consider pupils' motivation and theories about themselves. For example, Carol Dweck (an American academic) distinguishes pupils who have an entity theory about intelligence/ability from those with an incremental theory. Entity theory suggests that you believe that you are born with a fixed amount of intelligence; so taking risks with hard open tasks has no pay-off as you risk showing that you are not as clever as you believe. Incremental theory implies that you can develop intelligence; so open challenging tasks offer the chance to become a better learner. Making the teaching of thinking skills work is bound up with making pupils believe that they are capable learners and that it is 'cool' to learn. The good news is that pupils can change their theory about intelligence.

Task 4

Reflecting on pupils' theories about themselves 15 minutes

Consider the same class as in [task 3](#), or a class you have taught some thinking lessons to. Which pupils appeared most at home with the task and relished the challenge (incremental theorists)? Which pupils seemed most anxious – worried about getting the right answer or uncertain of the purpose of the task (entity theorists)?

3 Characteristics of higher-order thinking lessons

We think nearly all of the time. So, in a sense, all lessons could be considered thinking lessons, but this misses the point.

So what is different about thinking skills lessons?

They focus deliberately on higher-order thinking. Bloom's taxonomy (see [unit 5 Starters and plenaries, appendix 1](#)) identifies six levels of thinking: knowledge, comprehension, application, analysis, synthesis and evaluation. The last three are regarded as more complex and demanding.

For teachers, one of the difficulties in teaching thinking skills is that it is more difficult to specify learning. This is because in such open learning contexts there may be a wide variety of learning outcomes. None the less it is important to have objectives and to pursue a focus whilst remembering that learning outcomes may be more diverse. In these circumstances the plenary takes on special importance in terms of drawing out learning – a process sometimes referred to as debriefing.

Lauren Resnick (1987) has characterised higher-order thinking as follows:

- higher-order thinking is not *routine* – your planned actions cannot be totally specified in advance;
- higher-order thinking tends to be *complex* – the total path is not visible (mentally speaking) from any single vantage point;
- higher-order thinking often yields *multiple solutions*, each with costs and benefits, rather than unique solutions;
- higher-order thinking involves *nuanced judgements* and interpretation;
- higher-order thinking involves the application of *multiple criteria* which sometimes conflict with one another;
- higher-order thinking involves *uncertainty* – not everything that is relevant to the task at hand is known;
- higher-order thinking involves *self-regulation* of the thinking process – this does not occur when someone else tells you what to do at every step;
- higher-order thinking involves *imposing meaning or finding structure* in apparent disorder;
- higher-order thinking is *effortful* – there is considerable mental work involved in the kinds of thinking and judgements required.

Extract from Resnick, L.C. *Education and Learning to Think*. Reprinted with permission from the National Academies Press, Copyright © 1987, National Academy of Sciences.

This is a generalised description. To help develop it, a parallel can be drawn with one of those occasions in adult life that is reputed to be highly stressful – moving house ([task 5](#)). To cope with such an event, it can be argued, you need higher-order thinking.

Task 5

Understanding higher-order thinking

10 minutes

Relate this description of the process of buying a new house to the characteristics of higher-order thinking and then consider the review questions at the end.

When you buy a new house you cannot make the decision in a simple routine sequence, like a formula. You don't know how things will turn out because you don't know which houses are available, whether you can sell your own or borrow enough money, whether other people will make higher bids or whether the houses have bad survey reports. As you consider possible houses all the front runners have pros and cons, none is perfect. So you have to start deciding priorities (multiple solutions and fine judgements). Different members of the family have different opinions (multiple criteria). Just when you think you have got the right house, someone else makes a higher offer or your buyer falls through (uncertainty). You can take advice but you have to get involved, stay calm and fairly rational, and think things through (self-regulation). You have to be really clear about what you are doing, how and why you are doing it, and how it will be achieved (imposing meaning). This is all effortful, to the point of being stressful.

Part of the importance of this kind of activity is that it reminds us that education is a preparation for life and pupils will face such situations. As educators we have the ambition to prepare them for such exertions. Some lessons need to be complex, demanding and even have elements of confusion.

Review questions

- 1 When you have tried thinking skills lessons, such as Odd One Out in [task 3](#), have pupils started to show signs of higher-order thinking? Are they looking for different solutions, using a variety of criteria, *struggling* to find meaning, thinking things through and making a real effort?
- 2 If the answer is generally 'yes', can you identify how this could be further improved, perhaps through structuring the task so that there are more acceptable solutions? If the answer is generally 'no', discuss your difficulties with a colleague.

4 National Curriculum thinking skills

The National Curriculum provides a framework of five thinking skills. These are:

- **Information-processing skills:** These enable pupils to locate and collect relevant information; to sort, classify, sequence, compare and contrast; and to analyse part/whole relationships.
- **Reasoning skills:** These enable pupils to give reasons for opinions and actions, to draw inferences and make deductions, to use precise language to explain what they think, and to make judgements and decisions informed by reasons or evidence.

- **Enquiry skills:** These enable pupils to ask questions, to pose and define problems, to plan what to do and how to research, to predict outcomes and anticipate consequences, and to test conclusions and improve ideas.
- **Creative thinking skills:** These enable pupils to generate and extend ideas, to suggest hypotheses, to apply imagination, and to look for alternative innovative outcomes.
- **Evaluation skills:** These enable pupils to evaluate information; to judge the value of what they read, hear and do; to develop criteria for judging the value of their own and others' work or ideas; and to have confidence in their judgements.

Task 6

Relating National Curriculum thinking skills45 minutes
to your subject at GCSE

The components of the five National Curriculum thinking skills are set out in the table below.

Have some recent GCSE papers and your current GCSE coursework tasks in front of you. Identify 5–10 of the skills on the basis of their importance to GCSE in your subject and note in the right-hand column where and why they are important to attainment.

National Curriculum thinking skills

National Curriculum thinking skills	Relevance to your subject
Information processing	
Collect material	
Sort and classify	
Sequence	
Compare and contrast	
Analyse parts and wholes	
Reasoning	
Give reasons	
Make inferences and deductions	
Explain	
Make decisions	

Table continues

Enquiry	
Ask questions	
Pose problems	
Plan what to do	
Predict outcomes	
Improve ideas	
Creative thinking	
Generate and extend ideas	
Hypothesise	
Look for alternatives	
Apply imagination	
Evaluation	
Develop criteria	
Weigh information	

Infusing thinking skills into Key Stages 3 and 4

In the current context in England, infusion of teaching thinking into subject teaching promises to be the most effective model of implementation. There are a number of ways in which this can be approached:

- using the Cognitive Acceleration through Science Education (CASE) or Cognitive Acceleration in Mathematics Education (CAME) programmes integrates the major principles of teaching thinking into lessons; for example, challenge (or cognitive conflict), collaborative talk and metacognition (www.kcl.ac.uk/kings_college/depsta/education/teaching/CASE.html and www.kcl.ac.uk/depsta/education/came.html) (see also [unit 2, section 2](#));
- adopting an approach such as Philosophy for Children, which is an excellent vehicle for promoting questioning, listening, collaboration and reasoning, and very valuable in English and the humanities subjects (www.sapere.net);
- using teaching ‘strategies’ as found in the *Leading in Learning* initiative, such as Reading images, Summarising, Analogies, and Audience and Purpose. With this approach it is important to maintain a focus on the five National Curriculum thinking skills.

Leading in Learning example

The following is an abridged version of one of the ten 'strategies' offered in the *Leading in Learning* whole-school initiative.

Task 7

Can you improve your planning?

30 minutes

As you go through the following *Leading in Learning* abridged example, reflect on either your existing experience or your trial of the Odd One Out strategy (task 3). What aspects or headings are potentially helpful in thinking about your planning for future lessons?

Reading images

This very basic but powerful technique involves providing pupils with a photograph or other visual image (reproduced with a white border) as a source of information and asking them to annotate or label it. They are asked to make links to what they already know, whether from previous work or general knowledge, and should suggest a title or overall heading for the image. There are variations around this basic approach. As with other thinking strategies, it is important for pupils to explain their thinking to others.

Rationale

We live in a highly visual society saturated with educational, work and leisure images. This strategy aims to develop pupils' visual literacy so that they are better equipped to decode this type of information. There can be a pay-off on many levels:

- working with visual information is a gateway to creativity and can boost the self-esteem of pupils who are struggling with literacy;
- pupils with visual learning preferences can learn more effectively through images of various kinds;
- in examinations for many subjects, information is often provided as diagrams, photographs, pictures and maps;
- there is great joy in being able to make sense of visual information.

The teacher's role is to get pupils to look harder, find patterns, make inferences and look for connections.

National Curriculum thinking skills addressed

Reading images is strong for:

- information processing in terms of analysing part/whole relationships;
- reasoning skills, particularly explaining thinking, giving reasons for opinions, drawing inferences and making deductions;
- creative thinking, including suggesting hypotheses and applying imagination.

Creating the right level of challenge

To support lower-achieving pupils you might:

- model the process of making links and annotations using an OHP, projector or interactive whiteboard, centred on questions such as ‘What can we see here?’, ‘What is happening here?’ and ‘What does this image show or suggest?’;
- place a ‘grid’ on a clear acetate sheet over the image and ask them to ‘read’ it square by square. This can support the analysis of part/whole relationships;
- create mixed-ability pairings to work collaboratively;
- encourage pupils to use questions such as ‘*Who* are these people?’, ‘*Where* have they come from?’, ‘*What* are they doing?’, ‘*Why* are they doing this?’ and ‘*When* is this happening?’. This is termed using the 5Ws – using *Who*, *What*, *Where*, *Why* and *When* – as question stems.

To challenge higher-achieving pupils you can:

- encourage them to move beyond what they can actually see, to what it implies or means, thus making more abstract or generalised links;
- ask groups to make a case for something in the image – different groups of pupils can be given different or opposing cases;
- ask groups to put a number of images in a time or causal sequence.

Identifying successful thinking

Levels of response or staged success criteria can be used to support you in short- and medium-term planning for progression.

- Connections are made but are largely unsubstantiated or inaccurate.
- One or two relevant connections are made relating to visible features in the image, but there are problems in explaining the connection. Cannot produce a reasoned title.
- Three or more direct connections are made relating to visible features in the image, but there are still weaknesses in explaining the connections. Difficulty in producing a title.
- A number of relevant connections are made and explained adequately with some linkage between the points. Able to generate a justifiable title or heading. Often able to describe basic processes used.
- Inferences or deductions are made beyond the direct connections. Use is made of wider knowledge, and some connections are likely to use higher-order or abstract concepts and thus be more generalised. May generate alternative explanations or interpretations. Can describe processes used in some detail.
- Can do all of the above but also shows an awareness of an overall strategy to complete the task, i.e. has gone from ‘this is how I did the task’ to a more generalised ‘this is how you tackle tasks like this’.

In progressing through these levels pupils would also be improving their skills in analysing part/whole relationships, and asking questions. In certain contexts they might also develop the skills of suggesting hypotheses and applying imagination.

Troubleshooting

Possible difficulties	Possible solutions
Pupils come to this ‘cold’ and don’t know where to start	Model the process, encouraging early efforts and stressing that there is no one right answer
Pupils focus only on visible features and are unable to make more abstract generalised links	Scan systematically and focus on visible features using the 5W strategy (<i>who, what, where, why, when</i>) to take them beyond the visible
Pupils do not justify the links they make	Pupils need to be pressed both in their groups and in the whole-class discussion to justify the connection they make with the picture
Pupils run out of steam quickly after finding two or three links	Start with pairs working together and then put pairs together to make fours which exchange connections – this creates a bit of peer pressure
Pupils can be timid, if they are unused to such approaches, in either challenging or extending connections made by others	This can be modelled by the teacher, who might make a vague connection and ask pupils whether enough had been said and invite them to ask questions for clarification etc.

Metacognitive plenaries

Questioning for metacognition helps pupils to unpack what and how they have learned and what they might do with this learning. The following sequence of generic questions can be used to encourage pupils to take a metacognitive approach to reading images.

Type of question	Generic teacher questions
A warm-up question	‘What connections have you made?’
Reflective – general	‘How did you do it?’
Reflective – specific	‘What makes a good connection?’
Lead-in question	‘What is your title?’
Reasoning question	‘Why that title?’
Challenge/ reasoning question	‘Do you prefer or like anyone else’s title? Why?’
Application question	‘Why is being able to “read” an image, picture or real-life scene important?’

Bridging scenarios

Stories, prompts, analogies and scenarios should be used to encourage pupils to make connections, generalise and see a bigger picture with regard to the value of being able to read images. They can be used at either the beginning or the end of lessons. They are vital to encouraging pupils to respond to application questions like the one above. Bridging scenario examples include:

- This is like the programmes that you see on TV, where a detective visits a crime scene and looks carefully around, at photographs, things that tell them about the person, things that are out of place and don't make sense, using visual clues to build up a picture.
- If you ever watch a builder sizing up a repair or extension job, a doctor examining a new patient, a clothes consultant giving the 'once-over' to a client, they all look at the 'problem' from all angles, looking for all the tell-tale signs, sizing up the job, making connections – they are reading the visual image.
- There are art experts who can look at a painting and can tell you not only what the painting is about but how it connects to the time and place it was painted and the ideas and motivation of the artist. For example, they might say that the priest in the background represents the power of the church and the dog curled up at his feet is the same as the one the artist had as a boy.

The important point is about the difference between looking and seeing. Two people can look at something but they see different things because one is able to make more connections and therefore to make more sense of what they see.

5 Improving planning and teaching of thinking skills lessons

In the previous section the *Leading in Learning* example related to 'reading images' had seven headings which can be used in general planning of thinking skills lessons. However, it is important that you develop a clear model of stages in thinking skills lessons as a basis for improving practice.

The launch

The notion of a launch is an analogy. Consider a space travel vehicle. It needs a rocket to launch it so that it can overcome gravity, get through the Earth's atmosphere and get headed on the right course. So it is with pupils on some occasions. They need the boost of the rocket to get them off the ground – in this case thinking! They need some help to get through the first hard, dangerous bit where they are dealing with the atmosphere and gravity. Once in space they can travel under their own power. But before they get there they will need their bearings, so:

- help pupils see the relevance or interest in the forthcoming task;
- outline what you are looking for in terms of learning behaviour;
- get pupils tuned to the type of thinking and effort required, which may require modelling;
- clarify any terms, concepts or procedures that may be required.

There will be some distinctive features to the launch of a thinking skills lesson.

- Objectives will focus on the thinking and learning in which pupils will be engaged.
- There is a strong emphasis on collaborative working, sharing ideas and talk together. You might suggest that they are sharing their brains to produce better ideas and thinking.
- Connections to other subjects or contexts are stressed, 'bridging scenarios'. You might ask pupils to consider what they already know that will help them with the task that they have been set.

Practical tip

If pupils fail to see the point of focusing on a thinking skill, offer them a real-life application and perhaps ask them if they can think of another.

Task 8

Helping pupils make connections

15 minutes

For a particular lesson tell the pupils a short story, real or imaginary, about yourself, friends, family or someone famous, that illustrates the relevance of the objective or aim of a lesson – it does not have to be a thinking skills lesson. Pupils love stories – so get them hooked but don't ramble on. You can think of it as being like a mini-fable that conveys an important message.

The middle or group-work phase of a thinking skills lesson

In the middle phase of the lesson pupils should be working in groups on the challenging open task that has been set. Their thinking is expressed in the talk that takes place. This talk helps stimulate further higher-order thinking. Part of the purpose of the plenary is to review and rehearse learning and therefore the middle phase of the lesson is an opportunity to eavesdrop on pupils' thinking and talking. If you do this you can ensure that this thinking is shared more widely in the plenary and greater learning is possible.

- A part of your role during the group-work phase is to administer and move the task on. Depending on the strategy this might be managing timing, handing out blank cards, etc.
- Watch and listen to groups as much as possible. Reflect on your questions for the plenary, making notes on anything that may be useful.
- If you need to intervene in a group which is really stuck:
 - encourage the group to discuss their own difficulties to see if they can be more self-reliant and less helpless;
 - encourage evaluation and reflection on progress and methods, so that ideas are refined and improved.
- On occasions, you may want to draw the class together in order to move their collective thinking on a stage. However, do not allow this to disturb the flow of group discussion or leave you short of time for the final plenary.

From a teaching perspective, distinctive features of the group-work phase are:

- eavesdropping on discussion in the groups in order to capture pupils' thinking to inform the plenary;
- keeping interventions minimal, because it is important to allow pupils to learn from struggling (collaboratively) with the task or problem.

Practical tip

If a group is obviously stuck or asks for your help, get them to identify specifically what they are finding difficult, then tell them that you will leave them to talk it through for two minutes. They should come up with one or two ways of overcoming the problem and you will return to help them to choose the best way or to offer another suggestion. You are encouraging them to be more self-reliant.

The plenary

The plenary is a vital part of every thinking skills lesson but is usually reported to be the most difficult phase. Pupils have to develop the ability to think and talk about learning so that they are aware of not only what they have learned but also how they have learned it – this is metacognition. It requires you to ask the right kinds of question and to provide the language structures that pupils need to talk about their thinking. Plan key questions in advance but be prepared to develop them on the basis of what you overhear during group work.

- **Ensure extended answers.** Ask a fair proportion of open questions and use supplementary prompts such as 'Go on', 'Tell me more about that' and 'Explain why you think that', so that you get extended answers.
- **Encourage build-up of joint thinking.** Encourage pupils to listen to each other and respond to, criticise, evaluate or disagree with each other: 'Does anybody have a different idea/approach/method?', 'Do you all agree?', 'I know that some other groups were thinking differently'. At this point your earlier listening and watching can pay real dividends as you can invite other groups or individuals to contribute.
- **Summarise thinking** and act like a broker for ideas and reasoning, so that good thinking is offered to all.
- **Focus on the 'how'.** On some occasions focus on how the task has been done. Identify main patterns and little idiosyncrasies, in terms of both how individuals thought and the ways in which groups operated.
- **Make connections.** If at all possible make a connection between the solutions or the methods and other contexts, so that pupils can see the wider purchase and application of the emerging learning. The examples in the 'Bridging scenarios' section for the Reading images strategy in [task 7](#) should provide some stimulus.
- **Establish generalisations** that relate to the five National Curriculum thinking skills so that they become more visible and transferable in other lessons and contexts. This is partly achieved through the stories, examples and analogies.

The singular distinctive feature of a thinking skills plenary is that it is not about subject content – the ‘what’ of the lesson. It is exclusively focused on the thinking skill – the ‘how’ of the lesson.

Practical tip

Plenaries can founder because pupils are not used to this process. They need some ‘think time’ to rehearse their thoughts. Put two or three questions on the board and tell groups that they have a few minutes to prepare answers. Make it clear that anyone might be expected to make a contribution.

Task 9

Improving the plenary

20 minutes

Choose a suitable thinking skills lesson when pupils are working well in groups and listen to them talking. Note down some of the things that they say and perhaps what is happening in the group. For example, one person is dominating, a group clarifies or rehearses what they have to do in a task, or someone has a good idea which is ignored. Actually write what you see or hear on paper.

Consider whether any of these observations would be useful in the plenary to draw out good strategies or ideas.

6 Evaluating impact

To sustain developments in classroom practice you need to get an immediate positive response from pupils. It isn’t helpful to wait months or years before pupils sit public examinations – we need the evidence of our eyes and other senses to confirm that we are doing something worthwhile.

Task 10

Evaluating successes and weaknesses of lessons

30 minutes

Consider any recent thinking skills lesson. Use the framework on the next page to analyse the successes and weaknesses of the lesson.

- Start with the successes. Tick any of the successes of the lesson in the ‘Evidence of positive outcomes’ boxes.
- Now tick any of the boxes labelled ‘Possible causes of positive outcomes’ which you think help explain the successes. Draw arrows between any of the ticked causes and ticked successes to indicate a link between them. Annotate the arrows if possible. You may wish to add extra causes and positive outcomes.
- Then do the same for weaknesses.

Any lesson could have both successes and weaknesses. An advantage of going through this process is that it can identify reasons for lesson outcomes so that they can be strengthened further or improved.

Evaluating thinking skills lessons

Possible causes of positive outcomes

different type of more open activity

a good launch

working in groups

plenary focused on reasoning or metacognition

Evidence of positive outcomes

pupils more interested or motivated

longer answers in plenary

better behaviour from 'difficult' pupils

good quality of talk between pupils

good ideas being generated

pupils seeing connections

Possible causes of weaknesses

unfamiliar, 'threatening' type of work

poor social skills amongst pupils

weak (or no) plenary

uncertain launch

Evidence of weaknesses

pupils slow to start

limited talk within groups

pupils give up or finish too easily/quickly

no deep or creative thinking

pupils don't talk about their thinking

pupils off-task

7 Progression

Teachers who have infused thinking skills within their own subject and/or planned to coordinate teaching across several subjects have found planning progression a challenge. Five approaches have been developed in the *Leading in Learning* initiative.

- 1 **Increasing the difficulty of the task:** This might be done by providing more information, introducing conflicting information halfway through an activity, or asking pupils to evaluate as well as create ideas.
- 2 **Reducing the amount of support:** The support may have been in the form of questioning, modelling, explaining or scaffolding that is available for the task. Reducing support means pupils are expected to work more independently. This can be done by asking them before they start an activity to consider what they already know that might be useful in the current task, and to generate a rough plan for tackling it.
- 3 **Increasing the complexity of the group work:** This can be done by, for example, asking pupils to work with those that they don't normally work with, perhaps in mixed-gender groupings. The richness of the group work and talk can also be extended by asking pupils to use cue cards. Cue cards are reminders to pupils, printed on card and available on the desk, to try particular behaviours in talk or thinking, such as 'Has everyone been asked for their ideas and been listened to?'.
- 4 **Increasing the level of challenge in the plenary:** You could ask pupils to reflect more on how tasks have been done and what significance this has. This will make the plenary more metacognitive.
- 5 **Expecting improved performance or attainment.**

In summary, you should aim for either an improved individual outcome or an improved group outcome. The significance of the latter is that what the members of a group may be able to do together this week, an individual from that group may be able to do next week on their own. That will show that the process or skill has been internalised. This corresponds with the idea of a Zone of Proximal Development, or ZPD, as proposed by the influential Soviet researcher Vygotsky whose work has become very popular in the West recently although he died in the 1930s.

Task 11

Experimenting with progression

30 minutes

- You could plan to use one of these approaches to progression in a forthcoming thinking skills lesson and evaluate its effect.

And/or:

- You could consider any thinking skills lessons you have taught recently. Which if any approaches to progression did you use in your planning and teaching? Were these approaches successful?

Thinking words

The table below contains a list of ‘thinking’ words from various Key Stage 3 National Curriculum subjects, which represent important skills. Do pupils really understand these words (which is more than being able to give a rehearsed definition)? If they understand them at all, do they have depth in that understanding? In relation to evaluation, do pupils know:

- what criteria are?
- that criteria selected should be chosen according to purpose?
- that values influence choice of criteria?
- what prejudice is?
- that criteria can be used in a variety of ways, such as equal weighting, loaded weighting, intuitively?

analyse	listen for gist	synthesise
identify	vary	speculate
evaluate	organise and present	question critically
prioritise	skim	adapt
select	scan	practise
clarify	summarise	improvise
classify	explore ideas	develop ideas
justify	investigate	compare
make decisions	listen with discrimination	weigh viewpoints
explain	experiment	rehearse
apply rules and conventions	make reasoned judgements	recognise limitations of accuracy
infer	deduce	check
narrow down	draw conclusions	use logical argument
refine	collaborate	combine

Task 12

Selecting thinking words for your subject

30 minutes

Without looking at the National Curriculum programmes of study, your subject framework or departmental schemes of work – in other words using a ‘gut’ response – select about ten ‘thinking’ words from the table that you think are particularly important in your subject across Key Stages 3 and 4.

If you are working collaboratively, compare your list with colleagues from either the same department or other departments. What have you got in common?

Now select just three of these words which you regard as most important. Identify from your departmental schemes of work how they are taught – are they explicit or implicit? They are implicit if pupils are just meant to pick them up along the way.

Compare your long list of ten and shortlist of three with the five National Curriculum thinking skills. Can you link your thinking words with the five National Curriculum thinking skills: Information processing, Reasoning, Enquiry, Creative thinking, and Evaluation?

Summary of research

Two research reports provide a backdrop to this booklet. They are *From thinking skills to thinking classrooms: a review and evaluation of approaches for developing pupils’ thinking* (McGuinness 1999), which was a DfEE research report, and *Teaching thinking skills* (Cotton 1991), prepared by one of the major centres for teaching and learning in the USA.

The report by Kathleen Cotton establishes some important contexts.

- Nearly all the thinking skills programmes and practices investigated made a positive difference to achievement levels of students.
- Gains in achievement levels were reported most commonly in relation to creative and critical thinking skills, and metacognition.
- There was a strong emphasis in the research studies on classroom climate, such as high expectations, teacher ‘warmth’ and encouragement. It is seen as important that pupils feel free to explore and express opinions, consider alternative opinions and justify their thoughts and ideas. Moving beyond one’s normal mental habits is *risky* and needs nurturing.
- The success of a programme depends considerably on ‘implementation’ factors such as management support, appropriateness and the extent to which it is put into operation in the intended manner, so that it is not superficial, partial or cutting corners.

Cotton’s report is from the USA, so it is valuable that the McGuinness report is written with the British context in mind. It is important to note that this document puts greater emphasis on interpretation and recommendations for policy and practice. Some of the selected findings are given in the table below with some commentary in relation to effective implementation.

Selected findings	Commentary
<p>Raising standards requires that attention is directed not only on what is to be learned but also on how children learn and how teachers intervene to achieve this.</p>	<p><i>This suggests that much greater emphasis be given both to developing pupils' generic capability as learners and to developing teachers' skills in the classroom to make critical interventions.</i></p>
<p>A successful prototype for developing curriculum materials was identified: strong theoretical underpinning; well-designed, contextualised materials; explicit pedagogy; teaching support and programme evaluations. Curriculum materials alone are not sufficient.</p>	<p><i>Producing training materials or a folder is not sufficient. Teachers need to work together with support, attending to their practice and their understanding of the principles of teaching thinking. The KS3 Strategy, through its consultants and networks, can provide much of this support. LIG collaboratives also provide an appropriate infrastructure.</i></p>
<p>There is scope for ... more systematic work within subject areas ... to examine commonalities and differences between thinking skills as they are exercised in disciplinary contexts.</p>	<p><i>This highlights the incalculable practical value of cross-subject collaborative work within schools.</i></p>
<p>(There are) opportunities for embedding thinking skills across the curriculum and there are clear arguments in favour of doing this. Nevertheless, the challenges of adopting an infusion approach should not be underestimated, especially the risk that the thinking skills framework may become trivialised or 'watered down'.</p> <p>Much of the research on the efficacy of teaching thinking was conducted under optimal learning conditions and problems with scaling up and transferring the effects of everyday classrooms have been identified.</p>	<p><i>There is a strong echo here of the warning in Cotton's work about the importance of implementation factors. There is a tendency for some schools to say 'We are <u>doing</u> thinking skills'. One of the characteristics of schools that are implementing rigorously is that they know how much there is still to do and learn, especially in relation to managing discussion and developing metacognition and transfer.</i></p> <p><i>One of the aspects of implementation is how an institution embeds its successes. Great attention needs to be given to sharing practice, inducting new members of staff and refining schemes of work to reflect progress.</i></p>

Table continues

<p>... the idea of thinking classrooms, and schools as thinking communities, requires further articulation and interpretation Nevertheless thinking classrooms brings thinking skills analysis the full circle and links with emerging research on school ethos.</p>	<p><i>There is the need for a shift in mind-set to make 'thinking' an established feature of schools. To encourage pupils to be more autonomous, ways have to be found for giving them more choice and control, not only in managing their own learning but also in contributing to school development. Likewise, to develop pupils as learners schools need to create the conditions for staff to think and learn.</i></p>
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Thinking skills frameworks for post-16 learners: an evaluation (Moseley et al. 2003), although focused on post-compulsory education, reviewed evidence relating to wider age groups. This report recognised from the research evidence that:

If learners are to benefit from thinking skills approaches they need to develop a deeper understanding of learning and instruction and appreciate the value of thinking skills in daily life.

To do this for Key Stage 3 and 4 pupils means that teachers must help them to blur the sharp boundaries between school and other aspects of their lives.

References

- Cotton, K. (1991) *Teaching thinking skills*. School Improvement Research Series, North West Regional Educational Laboratory (www.nwrel.org/scpd/sirs/6/cu11.html).
- McGuinness, C. (1999) *From thinking skills to thinking classrooms: a review and evaluation of approaches for developing pupils' thinking*. DfEE research report RR115.
- Moseley, D. et al. (2003) *Thinking skills frameworks for post-16 learners: an evaluation*. Research report to the LSDA, University of Newcastle and University of Sunderland.
- www.standards.gov.uk (and select thinking skills).

Next steps

This unit has explored an aspect of teaching and learning. You may wish to develop your ideas further, to consolidate, apply ideas in different contexts or explore an aspect in more depth and innovate.

Reflect

What have been the key learning points for you?

What has been the impact on pupils?

Here are some suggestions as to how you may develop practice further:

- Continue working with your own class, using learning logs to help pupils to become more reflective about their learning. Evaluate the impact of using the logs by reviewing a sample of the logs after a period of time and interviewing one or two pupils.
- Enlist the help of a TA or student mentor (e.g. from the sixth form) to assist with questioning particular groups of pupils or to eavesdrop on group discussions and record points to feed back to you.
- Work with a colleague in another department who teaches the same class as you. Choose a relevant thinking skill and plan lessons in both subjects to develop that skill explicitly. If possible, observe each other's lessons. Meet between the lessons to review progress and identify points for the second lesson. Meet afterwards to assess the impact of your lessons.
- Find out about local support networks of teachers developing thinking skills, as a way of sharing developments and extending your practice.

For further reading the following publications are recommended:

- Baumfield, V. (2002) *Thinking through religious education*. Chris Kington Publishing. ISBN: 189985746X.
- Claxton, G. (1999) *Wise-up – the challenge of lifelong learning*. Bloomsbury. ISBN: 1582340927.
- DfES (2002) *Training materials for the foundation subjects*. Ref. DfES 0350/2002.
- Dweck, C. (2000) *Self-theories – their role in motivation, personality and development*. Psychology Press. ISBN: 1841690244.
- Fisher, P. (2002) *Thinking through history*. Chris Kington Publishing. ISBN: 1899857443.
- Leat, D. (ed) (1998) *Thinking through geography*. Chris Kington Publishing. ISBN: 1899857990.
- Lin, M. and Mackay, C. (2004) *Thinking through modern foreign languages*. Chris Kington Publishing. ISBN: 1899857958.
- Nichols, A. (ed) (2001) *More thinking through geography*. Chris Kington Publishing. ISBN: 1899857435.
- Resnick, L. (1987) *Education and learning to think*. National Academy Press. ISBN: 0309037859.
- Shayer, M. and Adey, P. (eds) (2002) *Learning intelligence*. Open University Press. ISBN: 0335211364.
- Shayer, M. and Gamble, R. (2001) *Bridging from CASE to core science*. The Association for Science Education, Black Bear Press. ISBN: 0863573322.

Setting future targets

Having considered your next steps, you may wish to set yourself some personal targets to support your own continuing professional development. You could use these ideas to inform your performance management discussion.

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Task 13

Setting your targets

40 minutes

When setting targets for the future you may want to discuss the possibilities with a colleague or your line manager.

Whatever you decide to do, you will need to consider the following.

- What are your objectives for the next year?
- What are the expected outcomes in terms of pupils' achievements?
- What strategies will you employ to achieve these outcomes?
- How will you track progress over the year?
- How will you know whether you have been successful or not?