Spiral Thinking

Jane Simister describes how staff at one school set about planning to develop thinking across the curriculum

Northwood College is a well-respected girls independent school in Middlesex with pupils aged from three to eighteen years. It already gains very good results at GCSE and A level and is in the first division of the league table for top independent schools. However, convinced that 'We should not be preparing students for a life of tests, but for the test of life' (Costa: 2002), headteacher Ruth Mercer made the decision to invest in the interest shown by one of her staff in the teaching of thinking skills. Recognising that this might be the key to maximising not only the academic potential of the pupils but also their ability to become responsible, confident and creative citizens of the future, the school set out on a process of re-defining itself and its approach. This article outlines the first chapter in the development of the *Spiral Thinking* initiative and the establishment of the *Advanced Cognitive Development Programme*.

Phase 1: Early beginnings

The initiative began with a research project (Simister, 2004). Concerned that students may frequently be 'active passive learners' – that is, they have the drive and determination to succeed, but feel this is most successfully achieved by spoon feeding themselves with other people's ideas and theories – a 'thinking club' was established for a group of twenty-one Year 5 pupils. The club convened twice weekly at lunchtimes over twenty five sessions. We used the acronym: THINK!© (Figure 1) to guide the meetings.

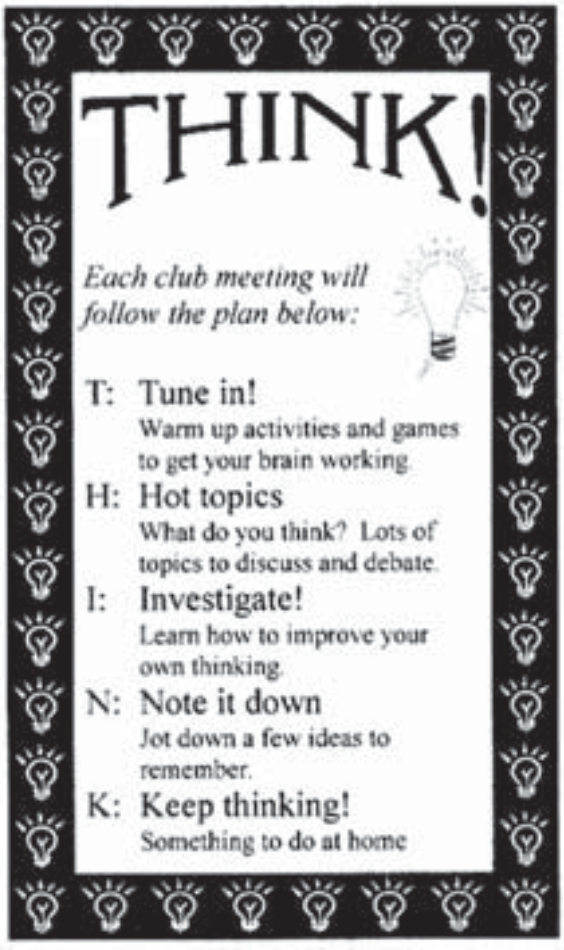


Figure 1: The session outline given to pupils

T: *Tune in*: warm up games and puzzles to get pupils thinking
H: *Hot topics*: ten minutes devoted to a philosophical or moral discussion
I: *Investigate:* an introduction to brain theory, learning styles, questioning, information gathering, critical and creative thinking
N: *Note it down*: an opportunity to complete a written activity or make an entry in 'thinking logs'
K: *Keep thinking:* a follow up activity for pupils to consider before the next session

The pupils were enthusiastic about the lessons. It appeared that a relatively short-term project such as this could have a positive impact upon pupils' attitude towards their thinking and learning – making them more curious and willing to reflect critically on their opinions. Furthermore, notes taken during the 'hot topic' discussion sessions chronicled a very encouraging progression in the skills needed for logical argument, as well as a growing confidence and ability to express ideas.

Y4 pupils devise 'thinking questions' about a rather strange visitor

Following the success of the thinking club, weekly thinking-skills lessons were scheduled for Year 5 pupils. Having lesson time specifically allocated to thinking skills enabled a curriculum that encouraged the development of metacognition, critical thinking and the skills of logical argument in more depth than had previously been possible. In these lessons, pupils devised their own brain analogies (see examples in Figure 2), investigated their learning styles, came up with ingredients for a successful thinking 'potion' (ideas such as courage, persistence, risk taking and rest were discussed) and learnt how to ask 'thinking' questions. Through discussion and group activities, pupils gained practice in evaluating and assessing statements by asking questions to uncover any hidden assumptions or qualifications. Finally, in the hot-topic debates, the pupils were introduced gradually to a taxonomy of discussion skills, ranging from expressing agreement to asking for reasons.

'My brain is like …
a Christmas tree, because you keep on adding the baubles and decorations which add and represent your knowledge. You can always add more on to make your brain (tree) more complex because you can never get enough thoughts. The money that you buy the decorations with are your efforts and practice. Each branch is a category. The star is your goal. If you have lights, it is a good idea.'
Alysha, age 10

'My brain is like …
lots of scribbles. I think it reminds me of that because everything I learn new makes the scribble neater. By the end of my life, it will be really neat.'
Shalinee, age 10

Figure 2: Examples of brain analogies

Despite an unfortunately placed hole-punch on one girl's folder producing the title 'Thinking Kills', we felt by the end of the year that the lessons had proved both popular and useful. Furthermore, a 'Thinking Day' held half way through the year had given other Key Stage 2 teachers the opportunity to begin to play a part in the initiative. The day was organised so that pupils, in 'house' groups of mixed ages, would rotate between an assortment of activities, each led by a different teacher and each designed specifically to promote logical, critical or creative thinking. A celebrity 'mathemagician' was also invited to hold sessions throughout the day.

Not only did the pupils enjoy the day, they learned from it. They became more sensitive to language and more aware of the processes of thinking. We received many positive comments afterwards such as: 'I really liked it and it made me think that I don't think as much as I should', 'I thought it would be boring but I was proved wrong', 'I thought that the day was really fun and it really made my brain work very hard', 'I thought it was really good and I liked all the activities because they were fun and I learnt how to think in lots of different ways' and 'I thought the thinking was brilliant because my mind was on everything in all the activities as we had to think a lot!'

Phase 2: Widening the initiative

Meanwhile, plans were afoot to develop the teaching of thinking skills throughout the school from nursery to sixth form. We felt that to have any chance of success the initiative must have the support and commitment of all staff. Talking in a fairly general way about the importance of 'teaching our pupils to think for themselves' was one thing; recognising what this might mean in practice was quite another.

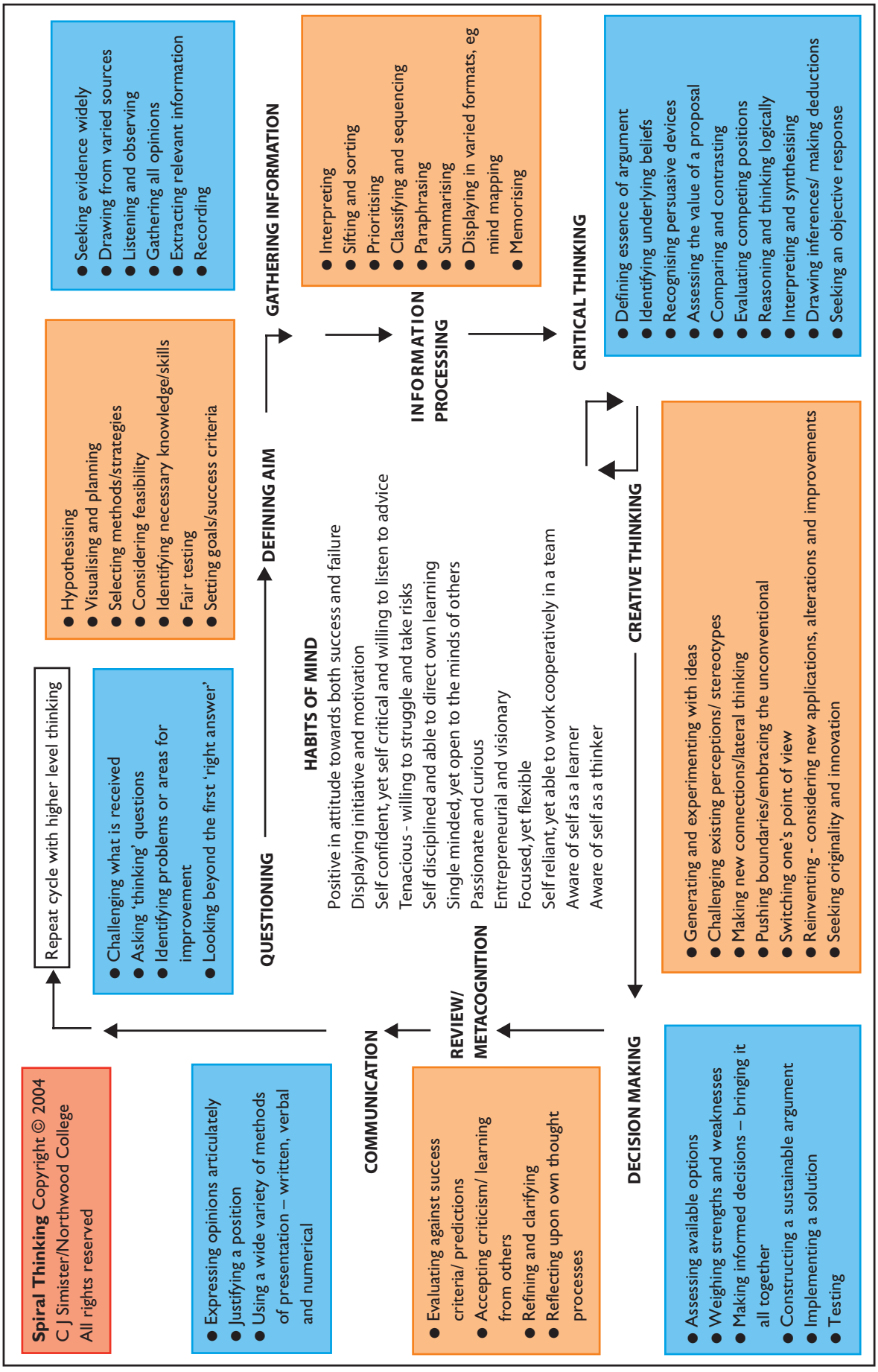
The first step was to develop a school-wide 'thinking' model. This was considered necessary for four reasons:

- to clarify what was understood by the term 'thinking skills'
- to offer a framework for teachers when planning lessons and schemes of work
- to provide pupils with a useful thinking 'toolkit'
- to create a visual resource that could be used by staff, pupils and parents

We ran an INSET day with a 'thinking skills' focus in February 2004. Teachers met in discussion groups to consider the quote, 'Education is what is left over when you have forgotten everything you were taught'. Educational 'wish lists' were drawn up, which specified those skills that teachers felt ideally should be 'left over', in order to give their pupils the best chance of being successful, useful and happy citizens of the future.

The expertise of the teaching staff across all ages and subjects proved invaluable. Some tremendously interesting discussions ensued and it was encouraging to discover how united the staff were in their suggestions. Drawing on the results, a diagram was created to give a structure to the many ideas that arose – and so 'Spiral Thinking' was born (see Figure 3).

Figure 3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Repeat cycle with higher level thinking
QUESTIONING
Challenging what is received
Asking 'thinking' questions
Identifying problems or areas for improvement
Looking beyond the first 'right answer'
DEFINING AIM
Hypothesising
Visualising and planning
Selecting methods/strategies
Considering feasibility
Identifying necessary knowledge/skills
Fair testing
Setting goals/success criteria
GATHERING INFORMATION
Seeking evidence widely
Drawing from varied sources
Listening and observing
Gathering all opinions
Extracting relevant information
Recording
HABITS OF MIND
Positive in attitude towards both success and failure
Displaying initiative and motivation
Self confident, yet self critical and willing to listen to advice
Tenacious - willing to struggle and take risks
Self disciplined and able to direct own learning
Single minded, yet open to the minds of others
Passionate and curious
Entrepreneurial and visionary
Focused, yet flexible
Self reliant, yet able to work cooperatively in a team
Aware of self as a learner
Aware of self as a thinker
INFORMATION PROCESSING
Interpreting
Sifting and sorting
Prioritising
Classifying and sequencing
Paraphrasing
Summarising
Displaying in varied formats, eg mind mapping
Memorising
CRITICAL THINKING
Defining essence of argument
Identifying underlying beliefs
Recognising persuasive devices
Assessing the value of a proposal
Comparing and contrasting
Evaluating competing positions
Reasoning and thinking logically
Interpreting and synthesising
Drawing inferences/ making deductions
Seeking an objective response
CREATIVE THINKING
Generating and experimenting with ideas
Challenging existing perceptions/ stereotypes
Making new connections/lateral thinking
Pushing boundaries/embracing the unconventional
Switching one's point of view
Reinventing - considering new applications, alterations and improvements
Seeking originality and innovation
DECISION MAKING
Assessing available options
Weighing strengths and weaknesses
Making informed decisions – bringing it all together
Constructing a sustainable argument
Implementing a solution
Testing
REVIEW/ METACOGNITION
Evaluating against success criteria/ predictions
Accepting criticism/ learning from others
Refining and clarifying
Reflecting upon own thought processes
COMMUNICATION
Expressing opinions articulately
Justifying a position
Using a wide variety of methods of presentation – written, verbal and numerical

Spiral Thinking 2004

At the heart of the 'Spiral Thinking' model was placed the a list of 'habits of mind'. These qualities, it was felt, were fundamental to the Northwood College ethos and served as a reminder of those ideals to which pupils (and teachers!) should aspire. Their central position in the diagram was no coincidence: a thinking climate needs to be in place before specific thinking skills can be taught. Throughout our planning, we felt it was important to be looking for ways to help our students to take the initiative in directing their learning; to become confident when putting forward their own imaginative ideas; to be passionate about their discoveries and to discover that risk-taking is important and that mistakes are just as vital to progress as success.

Circling this central section are the key stages of thinking, loosely depicted as leading one to the other, but with the understanding that fluidity and flexibility are vital to any model of thinking. At the beginning lies questioning. Children are naturally curious, but tragically this often fades as they move through the school. By placing questioning at the beginning of the 'thinking' process, we wanted to highlight the importance of encouraging the pupils to ask enquiring, open questions, of striving to overcome their tendency to be satisfied with one 'right answer' and of urging them to pursue knowledge, understanding and ideas more deeply.

In 'Defining our aim', we described the planning stage. Pupils need to be given the chance to set their own research agenda by looking ahead and forming a clear sense of purpose; selecting which of their questions are most useful to investigate; forming hypotheses to be tested and criteria against which to measure success; and working out how to achieve their goals.

After this comes the research stage. Pupils are encouraged to be thorough, to research widely, to consider all sides of the debate or issue they are studying and not just to read and copy one source. In scientific subjects, this stage might involve conducting the experiment, as this would be one way of gathering relevant data.

Once information is gathered, it needs to be processed. Here we are looking to develop our pupils' ability to make sense of what they have discovered, to internalise it – not simply to cut and paste from books and websites. Pupils are taught how to sift out the key facts from the mass of detail, summarising the most important findings and making choices about how to display results.

Two looping arrows link the next two stages – critical and creative thinking – as these are very much interrelated. In order to make the step from repeating other people's ideas to critiquing them, pupils need to learn how to assess the validity of what they read and hear. To do so, they can be given critical thinking tools to:

- define what is at the heart of an argument
- identify reasons and underlying assumptions
- recognise the use of persuasive devices
- draw inferences
- begin to compare and evaluate competing arguments and evidence in a more rigorous and reasoned way.

Such skills, we have discovered, can be built into lessons from a very early age. At the same time, pupils must be encouraged to generate their own ideas, designs and theories, understanding that risk taking is vital and that failure along the way can sometimes contribute more usefully towards making progress than early success. In this way, pupils can be liberated from the anxiety that every idea must be a good one – as Wittgenstein put it: 'If people never did silly things, nothing intelligent would happen.'

The decision-making process ties together many of the stages described: pupils engage in the process of balancing, weighing up the evidence, making decisions and backing them up with sound, considered arguments.

Although placed at the end of the model, the two stages of review/metacognition and communication consist of skills that thread throughout the entire process. Pupils need to be taught to evaluate their work and their thinking frequently, reflecting upon the different methods and skills that they have used. In doing so, attention can be given to the 'habits of mind' listed at the heart of the model. In the course of discussion or through the completion of self-assessment sheets at the end of a project or piece of work, pupils learn to consider whether they did indeed display tenacity, curiosity or self motivation. Were any risks taken during the work? What did they do when things went wrong? How have their team skills developed? It is through repeatedly asking these questions that lessons are learnt, strategies are formed for next time and ingrained habits have a chance of being genuinely altered.

Furthermore, discussion is vital to encourage a clarification of ideas and pupils need to be given the opportunity to present their work using a variety of communication tools, both of a formal and informal nature.

The Spiral Thinking model was presented at a further INSET session and an opportunity was given for staff to suggest any further alterations. It was noted that several of the categories overlap each other, so the distinctions between stages should not be rigidly adhered to. For example, a certain amount of critical thinking needs to take place in the information processing stage, in order that pupils learn to spot what is relevant to the debate or issue they are investigating. Questioning will occur at every stage of the cycle. Most importantly, however, the model

expressed the beliefs held by the staff about those skills they believed should be central to teaching and learning at Northwood College.

Phase 3: Putting theory into practice

Over the course of the next two terms, teachers were encouraged to refer to the model when planning lessons and schemes of work, to recognise where lessons already developed particular skills, to note where gaps might exist and to seek ways of making alterations to lessons to provide greater opportunities for the development of independent, critical and creative thought. A planning sheet was distributed, with the request that each teacher recorded and evaluated a few lessons, to be shared and discussed at a whole school staff meeting.

Spiral Thinking Geography lesson

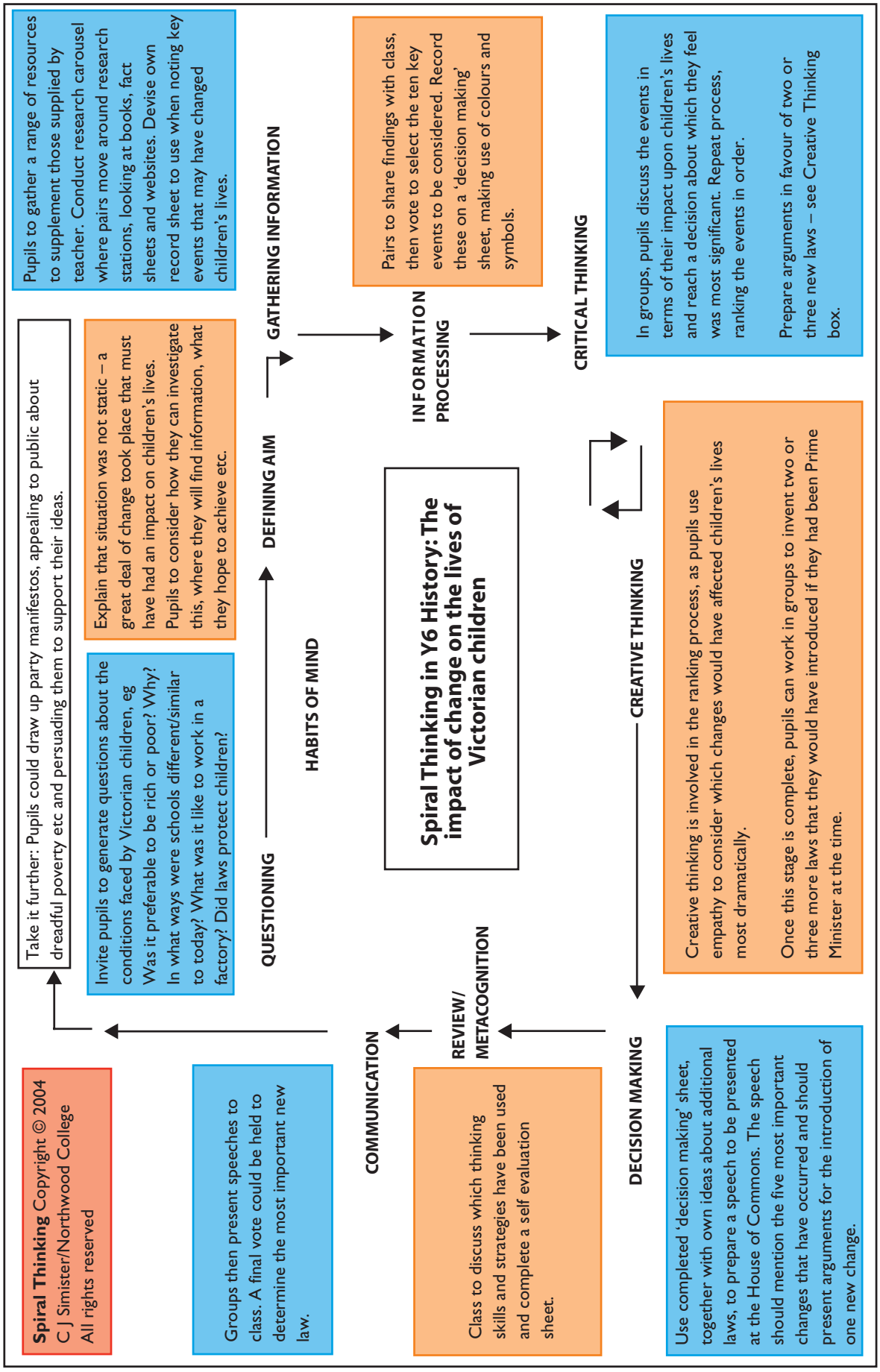
This meeting is scheduled to take place later this year. However, some early feedback has already been received and some very interesting lesson ideas are developing. One example is outlined in Figure 4.

Advanced Cognitive Development

For genuine change to take place, a great deal of time and support is needed. Although the Spiral Thinking model is now in place, it was felt that staff would benefit from the advice and back-up of a full time coordinator of the initiative. Furthermore, with the field of thinking skills flourishing at such a pace, Ruth Mercer wanted to make sure that the school kept fully abreast of new theories and strategies. For this reason, from September 2004, Jane Simister took up the position as Director of the Advanced Cognitive Development Programme (ACDP). The main aims of the ACDP are:

- To adopt a dual strategy of combining specific thinking skills lessons and courses with an integrated cross-curricular approach
- To promote the use of the Spiral Thinking model throughout the school, from nursery to sixth form, to ensure that curriculum lessons challenge pupils to develop higher level thinking skills as well as to absorb knowledge
- To develop a programme of weekly thinking skills lessons for KS2 and to introduce thinking skills in the Early Years and at KS1
- To encourage discussion opportunities that help pupils develop confidence and communication skills, as well as the ability to assess arguments logically and critically

Figure 4


Spiral Thinking in Y6 History: The impact of change on the lives of Victorian children
HABITS OF MIND
QUESTIONING
DEFINING AIM
GATHERING INFORMATION
INFORMATION PROCESSING
CRITICAL THINKING
CREATIVE THINKING
DECISION MAKING
REVIEW/ METACOGNITION
COMMUNICATION
Take it further: Pupils could draw up party manifestos, appealing to public about dreadful poverty etc and persuading them to support their ideas.
Invite pupils to generate questions about the conditions faced by Victorian children, eg Was it preferable to be rich or poor? Why? In what ways were schools different/similar to today? What was it like to work in a factory? Did laws protect children?
Explain that situation was not static – a great deal of change took place that must have had an impact on children's lives. Pupils to consider how they can investigate this, where they will find information, what they hope to achieve etc.
Pupils to gather a range of resources to supplement those supplied by teacher. Conduct research carousel where pairs move around research stations, looking at books, fact sheets and websites. Devise own record sheet to use when noting key events that may have changed children's lives.
Pairs to share findings with class, then vote to select the ten key events to be considered. Record these on a 'decision making' sheet, making use of colours and symbols.
In groups, pupils discuss the events in terms of their impact upon children's lives and reach a decision about which they feel was most significant. Repeat process, ranking the events in order.
Prepare arguments in favour of two or three new laws – see Creative Thinking box.
Creative thinking is involved in the ranking process, as pupils use empathy to consider which changes would have affected children's lives most dramatically.
Once this stage is complete, pupils can work in groups to invent two or three more laws that they would have introduced if they had been Prime Minister at the time.
Use completed 'decision making' sheet, together with own ideas about additional laws, to prepare a speech to be presented at the House of Commons. The speech should mention the five most important changes that have occurred and should present arguments for the introduction of one new change.
Class to discuss which thinking skills and strategies have been used and complete a self evaluation sheet.
Groups then present speeches to class. A final vote could be held to determine the most important new law.
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Pupils grapple with a baffling road construction task at a Puzzle Challenge evening

Where possible, other indicators will also be used, such as teacher assessment, questionnaires, Cognitive Ability Tests and course-specific evaluation activities.

It seems extraordinary that, as far back as the sixteenth century, the French philosopher Montaigne, wrote:

'I gladly come back to the theme of the absurdity of our education: its end has not been to make us good and wise, but learned … We ought to find out not who understands *most* but who understands *best* … We work merely to fill the memory.' (De Botton, 2000:153)

- To launch a page on the school's website to give further news of the programme to parents, teachers and the wider public, as well as to offer an interactive forum for pupils who wish to respond to displays, questions and competitions around the school
- To investigate and introduce ways of measuring the impact of the programme;
- To organise visits and events to inspire pupils, to include parents and to help embed the ethos that thinking is fun
- To involve parents and the local community as much as possible.

Conclusion

While still in the relatively early stages of Phase 3 of our programme, we feel very excited about the direction in which our school is heading. An outline of our Advanced Cognitive Development Programme has been presented to parents of Junior School pupils and we have celebrated its launch with a very successful Puzzle Challenge Day, during which pupils and their parents battled with a perplexing array of three dimensional puzzles.

We have a great deal still to do. Not least, it will be important to consider the formal evaluation of the programme in order to assess the degree of success of each of its component parts. This clearly poses challenges in itself, as judging the quality of a person's thinking is extremely difficult. Self assessment will play a part, as it is hoped that the focus on metacognition seen in the Spiral Thinking model should equip pupils with the tools needed to assess their own strengths and weaknesses. Through our emphasis on the delivery of a curriculum that highlights thinking skills, at Northwood College, we hope that our pupils will not simply gain full memories, but will become independent, creative individuals, who display initiative and motivation and who are tenacious and willing to take risks rather than simply being content to be spoon fed.

'This means we can pack our thinking bags and be ready to explore life.' (Jenna, Year 6)

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