

ORDER YOUR THOUGHTS

Problem solving is rarely a straightforward process, but a thinking map can guide children toward deeper insights, say **Helen Lewis** and **Russell Grigg**...

“What is the point of school?” asks Guy Claxton in the title of his provocative book. He feels that some schools are not doing enough to prepare children for the future demands of work and life, which include thinking flexibly and problem solving – both among the top 10 skills requested in today’s job advertisements (*The Guardian*, 22 April 2013).

Recent results from the Programme for International Student Assessment (PISA) also highlight the importance of why young people should understand how to apply what they know to new problems. Making such connections is seldom straightforward, but it can be made easier if you follow a thinking map – a process to guide and structure your thoughts.

Originally introduced by the American author David Hyerle in the 1970s to improve the problem-solving abilities of employees, thinking maps are visual tools to develop the thought processes that we all use. Transposed to the classroom, they can promote a common language of thinking among children and teachers.

One of the main benefits of using thinking maps is that they help to make the largely invisible process of thinking more visible. McGuinness (1999) suggests that thinking can be taught, provided the following key principles are followed:

- > thinking skills are made explicit;
- > thinking is taught through coaching;
- > metacognition is valued;
- > collaborative work is promoted;
- > good thinking habits are developed and
- > thinking is promoted across the curriculum.

The language of the classroom can sometimes be too broad and does not focus clearly enough on the type of thinking that is needed for a particular task. For example, many teachers will use phrases such as ‘Put your thinking caps on’. It is better to

model and display the precise language of thinking to children (e.g. "That was an excellent connection", "Your reasoning was very good because...") and name and notice such thinking when it occurs.

Children also need to think about how they know what they know. Hence each thinking map is surrounded by what is called a metacognitive frame (a rectangle drawn around the map). Metacognition, one of the buzzwords in thinking, refers to a learner's knowledge, awareness and control of the processes by which he learns. Within the frame, he explains how he arrived at his thinking by jotting references to sources such as books, people, websites, pictures, films, previous experience and so forth.

The real value of these metacognitive frames is in the dialogue that can be generated by children and teachers when they discuss the strengths, limitations and possible bias of each source of information on which they have drawn. Identifying what you don't know, generating questions and thinking aloud have been recognised as effective teaching techniques (Fisher, 1990).

There are eight different thinking maps in total and each deals with a specific type of thinking. However, in this article we only have space to discuss four: circle maps, double bubble maps, flow maps and multiflow maps (see Thinking Maps – right).

Thinking skills and the National Curriculum

The importance of teaching thinking skills is recognised in the curricula of Scotland, Wales and Northern Ireland. The national curriculum in England originally included five thinking skills (information processing, reasoning, creativity, evaluation and enquiry). Under the Coalition government's curriculum reforms, however, thinking skills are no longer explicitly mentioned. Nonetheless, the new national curriculum to be implemented in 2014 implicitly requires teachers to develop thinking skills in



specific knowledge contexts. For instance, in Years 5 and 6 pupils will be expected to 'make comparisons within and across books'. Figure 2 (right) shows an example of Year 5 children comparing two of Roald Dahl's most popular stories using a double-bubble map.

Transferable skills

Thinking maps share five characteristics that are beneficial to teachers when developing transferable skills across the curriculum. For example, here's how the characteristics relate to reading a story – a typical classroom activity.

1 Consistency

Thinking maps visually reflect the cognitive skill being defined, e.g. a flow map of three boxes could be used to show the beginning, middle and end of a story.

2 Flexibility

A flow map of a story could start at the beginning but grow in complexity to show many stages and sub stages. And it could be drawn rising from the bottom left to top right to reflect the rising action in a story



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3 Developmental

The flow map can be simple or complex and drawn by any learner, from an early years pupil to a university student, to reflect what he or she knows about a story.

4 Integrative

Thinking maps can be linked together. Hence with a story, a flow map can show the plot, while a double bubble map highlights similarities between characters.

5 Reflective

The metacognitive frame (frame of reference) is used for all thinking maps. The frame is represented by a rectangle drawn to enclose the map. It acts as a reflective tool so that learners can take stock and think about how they know the information presented within each map, such as the background of the author or the setting of the story.

Making the most of thinking maps

We worked with several case study schools in which thinking and literacy was central to development planning. In these schools, teachers introduced a map at a time and examples were placed around the school and discussed in assembly, as well as in sessions through the week. In this way, the profile of each map was raised and the children and teachers developed a common 'thinking' language. The maps were also shared with parents.

Thinking maps are suitable for use with all age groups. In the case study schools, they were introduced to nursery and reception classes through the use of practical resources. For example, plastic hoops were used to create a bubble map. A book about butterflies was placed in the centre hoop and children's descriptions of the insect were scribed by the teacher so they could be placed in the surrounding bubbles (hoops).

In the Year 1 classes, teachers asked mixed ability groups to complete circle maps together, with more able writers helping those less confident to get their ideas onto paper. This developed collaborative skills amongst the children. Circle maps were used at the beginning and end of a topic to help the children see how their understanding of different themes had developed. This allowed pupils to reflect upon how their knowledge can change and grow – which is an important part of metacognitive awareness. This also helped parents to see the learning that had gone on over the course of a topic.

In Key Stage 2, ICT tablets were used to record ideas and images were imported to enhance the maps further. This also supported children who found writing more difficult. As the children became more confident users of maps, they

THINKING MAPS

Fig. 1

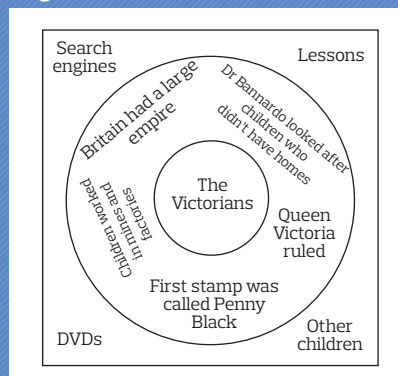
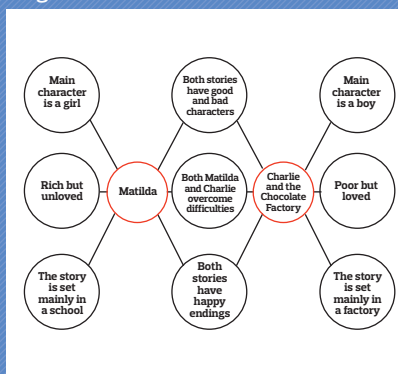


Fig. 2



CIRCLE MAPS (Fig. 1)

Purpose: defining in context. This helps children to gather their existing knowledge: "Tell me everything you know about this topic" When starting a topic on the Victorians, for example, children would list all they know about the topic in the outer circle and record the sources of their knowledge in the metacognition frame – the space outside the circle. As children learn more throughout the topic, they can return to the map and add additional information.

DOUBLE BUBBLE MAPS (Fig. 2)

Purpose: comparing and contrasting. Children consider

began to combine different formats and select the appropriate times for their use. For example, in a Year 4 class the children were asked to write a comparative piece about Roman and Celtic soldiers. Some of the children chose to first complete a circle map to note their existing knowledge – so that they "got everything down" and "didn't miss bits out". They then created a double bubble map to organise their thinking when comparing and contrasting the two soldiers, before completing

the similarities and differences of two subjects in an exercise of point and counterpoint. When reading a fiction text, pupils might compare the qualities of two characters. Children can note unique qualities as single bubbles, but any common qualities share a bubble and are linked to both characters. There is no limit to the number of similarities or differences that can be noted, and there does not need to be the same number of each.

FLOW MAPS (Fig. 3)

Purpose: sequencing and ordering. This map shows sequences, timelines, cycles and actions, allowing pupils to see the relationship between

their piece of written work. When asked why they had chosen to do this, and whether it was useful, they explained that doing this helped "sort out their thinking", or to "get their ideas in order" ready to complete the task.

We know that creative and critical thinking is becoming increasingly important. In his book *A Whole New Mind: Moving from the Information Age to the Conceptual Age* (2005), the writer Daniel Pink points out that the future

Fig. 3

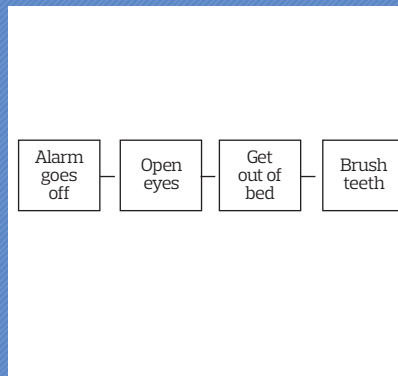
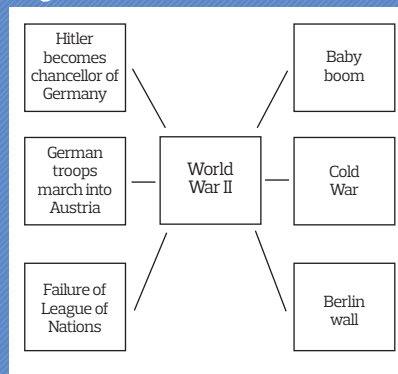


Fig. 4



the stages and substages of an event. Any life cycle or process in science can be illustrated by a flow map. They can also be used to illustrate the flow of thinking – for example, when carrying out problem-solving activities in maths.

MULTIFLOW MAPS (Fig. 4)

Purpose: analysing cause and effect. A multiflow map allows pupils to consider an event and either the causes of this, the effects, or both. This map is useful for analysing historical events, such as Kristalnacht. Remember there do not necessarily have to be an equal number of causes and effects.

belongs to a very different kind of person with a very different kind of mind – "creators, empathizers, pattern recognizers, and meaning makers." Teachers can draw upon resources such as thinking maps so that children are well prepared for this new age.

The authors would like to acknowledge the help of Grace L., Odette Nicholas, Sofie L. and the staff and pupils at Ysgol Y Castell, Carmarthen.