Tools to Enhance Young Children's Thinking

Angela K. Salmon

During a neighborhood walk, preschool children from Ms. Silvia's class took pictures of buildings, businesses, and people. Back in the classroom, Ms. Silvia displayed their pictures on a large screen and used the *See/Think/Wonder* thinking routine to help the children think and talk about their experiences on the walk. Thinking routines are short, goal-oriented, easy-to-learn, and child-centered classroom strategies that extend and deepen children's thinking. They can become part of the structure of everyday classroom life.

In the *See/Think/Wonder* thinking routine, Ms. Silvia first asked, "What do you *see*?" The children talked about the businesses and restaurants they recognized in the photos. One preschooler, Mark, expressed his interest in the tall buildings he saw. Being from Miami, Florida, he had many times overheard adults discussing ways to survive a hurricane. His curiosity about how tall buildings stay up in strong winds inspired him to start creating buildings in the blocks area.

Second, Ms. Silvia asked Mark, "What do you *think* about these tall buildings?" In response, Mark drew the structure of a building, then used it as a guide to create a tall construction with blocks. Other children joined Mark to test the stability of the block buildings by using different materials to produce hurricane winds.

Finally, Ms. Silvia asked the class, "What do you *wonder* about the stability of this building?" The children began to talk about ways to build a very tall block tower so that it would not fall down. Mark proved that his tower design was stable by waving a thin board at it to create wind. The tower did not fall down. Ethan and Sam also tested it by creating wind. After the test, Ms. Silvia invited the children to draw their own structures before building them. She asked the children questions that helped them use their understanding of gravity and stability to make predictions about their construction theories:

Courtesy of the author

Ms. Silvia: Why do you think it did not fall?

Sam: It won't fall because it is small.

Ms. Silvia: What do you think would happen if you built your tower taller?

Mark: It would fall.

Ms. Silvia: What did you see in the buildings in our neighborhood walk?

Mark: It is bigger in the bottom; let's put more blocks in the first floor.

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Ms. Silvia continued to use the *See/Think/Wonder* thinking routine to discuss the children's drawings of tall buildings in ways that would make their thinking visible. The Visible Thinking approach to teaching and learning uses thinking routines and documentation created by children or teachers to make the thinking process more visible in the classroom in a natural, manageable way. Through this thinking routine, the children connected their concepts of stability, foundation, and gravity to what they saw on the field trip and also to their drawings and block buildings. They continued to wind-test their structures, and they changed their drawings and buildings as they analyzed and discussed their findings for more than a month.

Effective teachers are powerful mediators of children's thinking and learning. They design learning environments that stimulate children's curiosity. As this example illustrates, teachers can also engage children in thinking routines throughout the curriculum to provoke thinking and promote metacognitive (thinking about thinking) activities.

Courtesy of Ana Seoane

Thinking routines

Thinking routines typically consist of a series of questions that teachers ask children in order to lead them through the steps of critical thinking and to help them understand where their own ideas come from. These routines support children's development as self-directed learners and promote learning for understanding (Project Zero 2010). They help children make connections between familiar and relevant events in their lives.

Teachers who promote young children's thinking by using thinking routines commonly see children using a language of thinking during play activities in the dramatic play, block, or writing areas. When the children in the opening story about the block activity tried to explain their theories about stability, gravity, and other physics concepts by discussing their ideas, drawing plans, and building block buildings, they were externalizing their thinking. Ms. Silvia stimulated Mark's thought process when she used the *See/Think/Wonder* routine while he observed, drew, and constructed his building.

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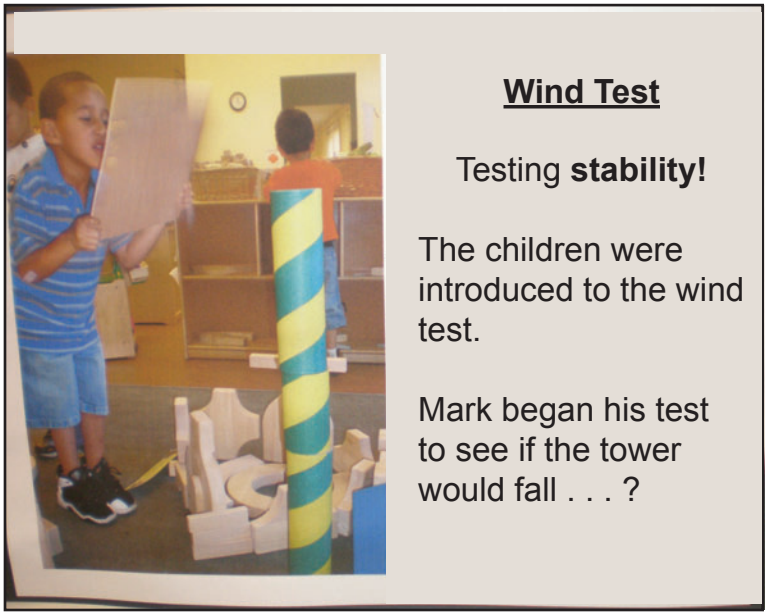
Ritchhart and colleagues state that children can activate a routine just by naming it and that only through repeated practice will it become a routine (Ritchhart et al. 2006). In this example, as the teacher uses the routine over time, her questions trigger the children to open their minds to observe, think, and inquire (*See/Think/Wonder*).

Thinking routines are a primary strategy for organizing memory; they are crafted to achieve specific goals, such as making connections or deep inquiry (Project Zero 2010). Young children can expand their repertoire of thinking strategies when they are exposed to and use thinking routines.



Courtesy of Silvia de Armas

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When thinking is part of their routine, children become alert to situations that call for thinking.

The Project Zero Visible Thinking project (Project Zero 2010; Ritchhart & Perkins 2008) developed a set of short, easy-to-learn thinking routines that target different types of thinking (see "Thinking Routines"). Teachers can use these thinking routines during circle time and small- and large-group activities. Teachers might also observe children's play and step in, without causing disruption, to use an appropriate thinking routine to help children take their play to a higher level, thus promoting learning.

Thinking routines help children construct knowledge from prior experiences and are meaningful and functional (NAEYC 2009; Salmon 2010). Four-year-old Alexander found a rock on the playground. He was interested in making the rock stay perched in the branches of a tree. This was the perfect opportunity for Ms. Karla to promote deeper inquiry and help him think with evidence by using the *Think/Puzzle/Explore* routine, combined with the *What Makes You Say That?* routine. Alexander's natural curiosity to test how gravity works was an open invitation for other children in the playground, including Ilene, to question and explore how to prevent the object from falling down.

Ilene offered Alexander a piece of cloth, and they both tried to use it to build something that would prevent the rock from falling. In the process, the children and teacher verbalized their thoughts and inquiries, prompted by the two thinking routines:

Ms. Karla: Why do you think this rock is falling?

Alexander: This rock is my dad, he is big. [Alexander is making connections.] (*As Alexander begins testing rocks of different sizes, the rocks continue to fall off the branch.*)

Ms. Karla: Let's *Think/Puzzle/Explore* how this can work. Why is it falling?

Ilene: This (*cloth*) can hold it. [Ilene is problem solving.]

Ms. Karla: What makes you say that?

Alexander: No, no, this is big . . . and heavy too. [He is reasoning with evidence.]

Ilene: But it can hold it like this (*manipulating the cloth and rock*). [She is reasoning with evidence.]

Ms. Karla: Alexander, you are puzzled or wondering about the weight and size, right? Ilene, is that how you want to explore how to hold a big and heavy rock with this piece of cloth?

Alexander: This is my dad (*pointing to the rock*). It is big and strong, see? (*Alexander puts the rock on a branch, trying to prevent it from falling.*)

Ilene: No, it's better with this, it is bigger (*inviting Alexander to use the piece of cloth again*).

Ms. Karla's questions prompted the children's thinking and problem solving.

As this example illustrates, thinking routines are flexible, allowing teachers and children to modify them to meet their needs (Ritchhart et al. 2006). When thinking is part of their routine, children become alert to situations that call for thinking. As a result, they develop positive attitudes toward thinking and learning (Ritchhart 2002; Ritchhart & Perkins 2008).

Making thinking visible

When educators try to engage young children in thinking and talking about thinking, they are confronted with the egocentric and concrete ways that young children think. One simple problem with thinking is that it is invisible. One

Thinking Routines

This routine . . .	encourages this type of thinking
What Makes You Say That?	interpretation with justification
Think/Puzzle/Explore	setting the stage for deeper inquiry
Think/Pair/Share	active reasoning and explanation
Circle of Viewpoints	exploring diverse perspectives
I Used to Think . . . Now I Think . . .	reflecting on how and why our thinking has changed
See/Think/Wonder	exploring works of art and other interesting things
Color, Shapes, Lines	exploring the formal qualities of art

Source: Project Zero 2010.

of a teacher's tasks is to find ways to make young children's thinking visible to themselves and others (Perkins 2003).

A key component of the Visible Thinking approach makes thinking visible by documenting learners' unfolding ideas as they think through issues, problems, or topics. Teachers can document children's thinking by using different media, such as video techniques and transcribed conversations accompanied by photographs and children's work. A thoughtful display of documentation in the form of "thinking maps" can help children and teachers connect ideas and observations. For example, teachers can create a visual presentation that includes a child's drawings about an idea and her transcribed words organized in a way that shows her thinking process.

According to Roskos and Christie (2002), play activity is shaped by the here-and-now, the just-previous activity, and all sorts of ideas and notions children have accrued from past experience. By using thinking routines and documenting the children's responses, teachers can make children aware of their own thinking. Teachers can then scaffold children's language and concepts about the world (Salmon 2010). By bringing to light what children understand, teachers can help them reach a higher level of development (Vygotsky [1930–35]1978).

Documentation also enables young children to see their own thought processes. When children speak, write, draw, build, or dramatize their ideas, they are making their thinking visible. Teachers, children, and parents benefit from examining documentation that reveals the ideas and modes of thought children bring to school. By enhancing children's thinking, thinking routines also promote a culture of thinking in young children (Ritchhart 2002; Salmon 2008).

Building a culture of thinking

A culture is shaped by the beliefs and practices shared by the members of a community. To create a classroom culture of thinking, teachers can begin by revisiting their own beliefs about and understanding of thinking. When the author asked a group of teachers, "What is thinking?" they came up with different responses, ranging from strategies they use to understand something to ways of managing information. When teachers think about thinking, their teaching style tends to be more child-centered (Barahal 2008).

Using the language of thinking in daily routines and conversations with children fosters a classroom culture of thinking.

Thinking can include many different mental processes, such as compare, infer, explain, and analyze. Consider the difference between "Let's look at these two pictures" and "Let's compare these two pictures." The verb *compare* encourages children to use a higher level of critical thinking.

Thinking routines help incorporate thinking language into the classroom because they both promote a thinking disposition in children and create the language to do so. Thinking dispositions are inclinations and habits of mind that support productive thinking and are teachable over time across diverse situations (Tishman, Perkins, & Jay 1995; Ritchhart 2002; Ritchhart & Perkins 2008).

Children's conceptions of thinking

Thinking about thinking is a difficult task for a young child, but not impossible for a teacher to encourage. The way a teacher asks questions can make a difference in provoking good thinking. If a teacher asks a child what he is thinking about, a child may respond, "I'm thinking about my dog," or "I'm thinking about my birthday party." Children typically respond to this question by mentioning objects, people, or events in their lives. If a teacher asks a question that already contains the answer—for example, "Do you think with your brain?"—the child will probably give the short and obvious answer, yes.

On the other hand, if the teacher asks a child an open-ended question—such as "What is good thinking?"—she can expect a variety of responses, depending on the nature of the question. For example, 5-year-old David's response to this question was, "It's a hard question (*he closed his eyes and continued*) . . . because it is invisible." This response showed the teacher that David was thinking beyond memories of concrete things (mom, toy) or of events to grasp concepts that are essentially "invisible." These kinds of questions help children see that thinking goes beyond recognizing objects and memories to being a method for solving problems or understanding the world. Research indicates that teaching children to be alert to or describe what's going on inside their heads helps them to become aware of their own language and thoughts (Costa 1987)—an essential step in learning to learn.

Courtesy of Adriana Alvarado

Thinking through art

The arts can foster critical thinking and the ability to use logic and reasoning in problem solving. For example, the 3-year-olds in Ms. Alvarado's class used a routine their teacher created, *See/Think/Explore,* to analyze the art of Carlos Cruz-Diez. This artist uses color changes to create a sensation of movement as the viewer shifts position. While investigating these color and line effects, the children developed critical thinking and problem-solving skills.

In a follow-up activity, Ms. Alvarado hung from the ceiling colored pieces of yarn and objects of different shapes to inspire the children to use the *Colors/Shapes/Lines* thinking routine to explore the formal qualities of art. One of the children, who had limited knowledge of English, identified all of the shapes that he could create by manipulating the yarn and by moving from one place to another. In the process, he connected the colors and shapes from the yarn with real objects around the classroom and with his orange bicycle at home. In his explorations, he began to use the English vocabulary that the children had used when analyzing the Cruz-Diez painting in the *See/Think/Explore* activity. Throughout his yarn explorations, he verbalized his thoughts and created stories connected to the yarn designs he made. In this case, the teacher's use of the *See/Think/Explore* routine fostered the child's deeper inquiry and re-creation of designs that had meaning to him.

Thinking routines and documentation are tools that enhance children's cognitive development by helping them become aware of their own creative thinking and problem-solving skills.

Conclusion

Critical thinking is an active, purposeful, and organized cognitive process. Research has shown it can be explicitly taught (Tishman, Perkins, & Jay 1995; Ritchhart & Perkins 2005, 2008; Barahal 2008; Salmon 2010). Teachers' use of routines is important, not only to give children a sense of security and confidence, but also to create habits of mind as they develop a culture of thinking. When thinking routines become part of the classroom culture through repeated practice, they create patterns of thinking and learning that become part of the child's intellectual character (Ritchhart 2002). Thinking routines and documentation are tools that enhance children's cognitive development by helping them become aware of their own creative thinking and problem-solving skills.

Thinking routines are easy to teach and developmentally age-appropriate; they not only activate children's prior knowledge but also expand their thinking. Their flexibility allows teachers to adapt thinking routines for use with young children. Although it can be challenging to engage young children in thinking about thinking, the thinking routines provide teachers with insights they can use in assessment and for curriculum planning.

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