1. Simply put, metacognition means “thinking about one's own thinking.” There are two aspects of metacognition: 1) reflection—thinking about what we know; and 2) self-regulation—managing how we go about learning. Taken together, these processes make up an important aspect of learning and development. Developing these metacognitive abilities is not simply about becoming reflective learners, but about acquiring specific learning strategies as well.

2. Sometimes people use the phrase “going meta” when talking about metacognition, referring to the process of stepping back to see what you are doing, as if you were someone else observing it. “Going meta” means becoming an audience for your own performance—in this case, your own intellectual performance. How do we help students become thoughtful about their own performance as they are learning to reason about mathematics and history? The challenge is helping students learn how to “go meta” in regard to thought processes that are not directly visible in order to improve their cognitive performances. Teachers must create the classroom equivalent of the mirror on the dance studio wall or the videotape of the golf swing.

3. If one aim of schooling is to prepare children to be lifelong learners, then it is important to help students become aware of themselves as learners and to take control of their own activities.

4. “As long as our activity glides smoothly along from one thing to another ... there is no call for reflection. Difficulty or obstruction in the way of reaching a belief brings us, however, to a pause. In the suspense of uncertainty, we metaphorically climb a tree; we try to find some standpoint from which we may survey additional facts and, getting a more commanding view of the situation, decide how the facts stand related to one another.”
   (Dewey, 1933, p. 14)

5. Young children build their knowledge base through concrete experiences with physical materials that they manipulate. When language is used to describe their experiences (“Oh look, you have two stones. Now you have three!”) children develop concepts that, with feedback and instruction, aggregate into more systematic knowledge. In areas in which children do have a knowledge base, they are quite capable of regulating their thinking in a variety of ways.

6. Before they learn metacognitive strategies, children do not use tactics like planning their work or monitoring their own problem solving. They do not realize that they can use strategies and short-cuts to help them solve problems. This is not to say that young children do not have metacognitive capabilities. A classic research example involves three-year-olds who were asked to remember which cup a toy was placed under. Children were able to spontaneously use a number of strategies, like placing a hand on the cup, or moving the cups around to help them remember the location. They were able to use strategies to help them think and remember, evidence that even very young children can be purposeful in their activity (Wellman, Ritter, & Flavell, 1975).

7. Students can be encouraged to develop a sense of their own knowledge by asking questions such as, “What do I know? What don’t I know? What do I need to know?” Teachers can help students to reflect on what they know and what they want to know as they embark on the study of a new topic. Students can reflect again on what they know as they conclude a lesson or unit. During the course of their work, teachers can encourage a reflective stance toward learning that helps students assess and direct their own emerging understandings. It is not only the teacher’s job, but also the students’ responsibility to assess and direct their own learning.

8. A number of conditions support a metacognitive classroom environment. Learning environments that are knowledge-centered and learner-centered, and that take into account the role of assessment in learning, lay the foundation for a reflective classroom (Bransford et al., 2000). “
9. “Learner-centered” classrooms take into account students’ current knowledge, skills, attitudes, and beliefs: if teaching is conceived as constructing a bridge between the subject matter and the student, learner centered teachers keep a constant eye on both ends of the bridge. The teachers attempt to get a sense of what students know and can do as well as their interests and passions—what each student knows, cares about, is able to do, and wants to do” (Bransford et al., 2000, p. 136)

10. Developing a culture of metacognition in the classroom—where students are encouraged to develop this kind of awareness—begins with making the purpose of learning activities and the goals for performance clear to students. Most of us would not leave for a trip without having some sense of our destination. Our destination affects how we prepare, what we pack, and the kind of experience we want to have. However, in schools, it is often more apparent to the teacher than to her students why they are learning something.

11. An emphasis on self-assessment helps students to develop the ability to monitor their own understanding and to find resources to deepen it when necessary .... Learners get opportunities to test their mettle, to see how they are doing and to revise their learning process as necessary. Without these assessment opportunities, the quality of learning can be disappointing—yet, [too often] this is not discovered until the end of the project when it is too late to change and revise the process (Barron, Schwartz, Vye, Moore, Petrosino, Zech, & Bransford, 1998, p. 284).

12. Classroom activities that call on these metacognitive strategies take many forms and vary depending on the topic. Generally, however, activities like journaling (where students keep a journal in which they reflect on what they understand, what they are learning, and what they do not understand); process reflection (where students reflect on their process of learning, including what worked and what did not work for them); or self-assessment (where students assess their own work against standards or criteria for quality) are all ways of activating metacognitive skills.

13. When students assume responsibility for their own learning, they reflect on their accomplishments, evaluate their work, decide on where changes are needed, define goals, and identify sound strategies for attaining them. If students are to become thoughtful individuals who can assume responsibility for learning, they must be taught how to analyze and evaluate their work. Teachers must help them define realistic yet challenging goals for their continued learning and show them appropriate strategies to attain those goals.

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14. Teachers who promote reflective classrooms ensure that students are fully engaged in the process of making meaning. They organize instruction so that students are the producers, not just the consumers, of knowledge. To best guide children in the habits of reflection, these teachers approach their role as that of “facilitator of meaning making.”

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15. We have traditionally told students what we see and what we value—very often at precisely the point in their learning where they should be discovering what they see and what they value. In doing so, we have reduced the likelihood that students will use past experiences in writing to shape subsequent experiences. We have eliminated the valuable opportunities for students to learn about themselves and about their writing—and for us to learn about them.

Roberta Camp (1992)

16. Reflection is a critical component of self-regulation. Self-regulated learners are aware of the strategies they can use to learn and understand when, how, and why these strategies operate. They can monitor their own performance and evaluate their progress against specific criteria. They can recognize improvement and identify strategies for dealing with challenging situations. They know how to choose appropriate goals, can develop and implement reasonable plans, and can make appropriate adjustments if unforeseen circumstances occur. In short, self-regulated learners are strategic.

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