How Students Learn: History, Mathematics, and Science in the Classroom
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How Students Learn builds on the findings detailed in the National Research Council’s 2000 report, How People Learn. It provides clear, teacher-friendly examples of how to apply cognitive principles in classrooms.

For example, the chapter titled “Fostering the Development of Whole-Number Sense” provides concrete examples of ways teachers can assess students’ level of number knowledge, and then ties these to what science can tell us about the developing abilities of 4-, 5-, 6-, 7-, and 8-year-old children to understand numeric concepts. The author discusses key issues for teachers, such as “defining the knowledge that should be taught,” and then provides design principles to help teachers apply the knowledge in their instruction.

There are three research-based principles of learning that are used to organize discussions:

Students come to the classroom with preconceptions about how the world works. If that initial understanding is not engaged, they may fail to grasp the new concepts and information, or they may learn them for testing purposes but revert to their preconceptions outside the classroom.

To develop competence in an area of inquiry, students must have a deep foundation of factual knowledge, understand facts and ideas in their conceptual context, and be able to organize knowledge in ways that facilitate retrieval and application.

A “metacognitive” approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress.

The authors suggest teachers use instruction consistent with what we know about how children learn to assess the “strengths and weaknesses of instructional strategies and the classroom environments that support those strategies.”