

## HOW LEARNING HAPPENS: FIVE FOUNDATIONAL IDEAS

Some of our colleagues at Lawrence Hall of Science have summarized a wide range of teaching and learning research in the context of earlier studies on the learning cycle, the findings in *How People Learn* (2000), and more recent studies. They've come up with five foundational ideas:

1. Learning is an active process of engaging and manipulating objects, experiences, and conversations in order to construct a mental picture of the world (Dewey, 1938; Piaget, 1964; Vygotsky, 1986). Learners build knowledge as they explore the world around them, observe and interact with phenomena, converse and engage with others, struggle to make explanations, and make connections between new ideas and prior understandings.
2. Learning builds on prior knowledge, and involves enriching, building on, and changing existing mental models, where "one's knowledge base is a scaffold that supports the construction of all future learning" (Alexander, 1986).
3. Learning that is situated in an authentic context, not in the abstract, provides learners with the opportunity to engage with specific ideas and concepts on a need-to-know or want-to-know basis (Greeno, 2006; Kolodner, 2006) and leads to deeper understanding.
4. Learning occurs in a complex social environment, and thus should not be limited to being examined or perceived as something that happens on an individual level. Instead, it is necessary to think of learning as a social activity involving people, the things they use, the words they speak, the cultural context they're in, and the actions they take (Bransford et al., 2006; Rogoff, 1998); knowledge is built by members in the activity (Scardamalia & Bereiter, 2006).
5. Learning complex ideas deeply involves considerable mental effort and persistence, which requires learners' motivation and cognitive engagement to be sustained, i.e., for learners to be engaged in, or actively committed to, the experience, task, or activity (Fredricks, Blumenfeld, & Paris, 2004). Engagement is multi-faceted and malleable, and affected by interactions between individuals and the context.