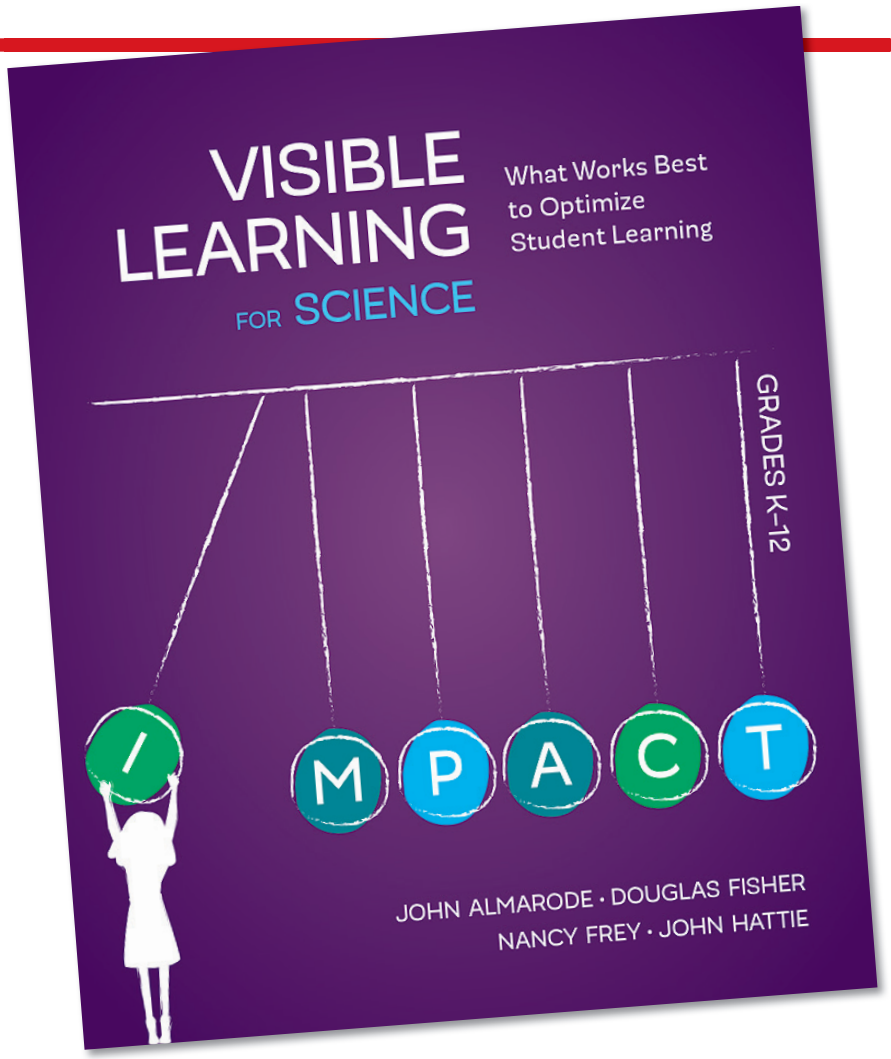

Thank you

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CORWIN
Fisher & Frey

HUGGING AND BRIDGING METHODS FOR LOW-ROAD AND HIGH-ROAD TRANSFER

Hugging to Promote Low-Road Transfer	Bridging to Promote High-Road Transfer
Students are learning to apply skills and knowledge. *Students can apply what they know about the circulatory system to the oxygenation of blood.*	Students are learning to make links across concepts. *Students apply what they know about the circulatory system to aerobic exercise and the calculation of aerobic capacity.*
The teacher is associating prior knowledge with new knowledge. *The teacher provides opportunities for learners to use their prior knowledge of a pump and the function of the heart.*	A student is using multiple representations to illustrate connections across disciplines or content. *A student compares and contrasts the circulatory systems of mammals, reptiles, amphibians, birds, and/or fish.*
Students are categorizing information. *Students categorize animals based on the structure and function of their organ systems.*	Students are deriving rules and principles based on examples. *Students use this categorization to derive generalizations about species (i.e., homeostasis, warm-blooded, cold-blooded, etc.).*
The teacher asks purposeful questions. *The teacher asks students about various strategies they might use to solve a problem related to vascular disease or illnesses associated with the circulatory system.*	Students use metacognitive thinking to reflectively plan and organize. *On their own, students try various strategies to solve a problem related to disease or illness.*
Students are summarizing and rehearsing knowledge. *Students engage in a series of inquiry tasks related to red blood cells, white blood cells, and plasma and justify their thinking.*	Students are creating new and original content. *Students write their own inquiry tasks using a variety of personal contexts to apply their understanding in new situations.*

(Continued)

(Continued)

Hugging to Promote Low-Road Transfer	Bridging to Promote High-Road Transfer
The teacher creates modeling and simulation opportunities for students to apply new knowledge to parallel situations. *Students develop models of technologies that model the structures and functions of the circulatory system in animals.*	Students are applying new knowledge to dissimilar situations. *Students compare the vascular system of animals to that of plants (i.e., vascular and nonvascular plants).*

Table 4.1

Applications of this learning, such as to the regulation of homeostasis, requires higher-level thinking. Without a deeper understanding of the structure and function of specific organ systems, students would not be able to transfer learning to this new situation. Many students struggle with complex science ideas because they have not developed the conceptual understanding of ideas and they do not have the deep learning required to apply these ideas to new and more abstract situations.

We must recognize that transfer as a mechanism (1) occurs even among the youngest learners and (2) changes in appearance as the learner progresses developmentally. From Mrs. Leonard's first graders to Ms. Easton's high school biology students, learners of all ages transfer their learning as they become more independent learners. However, in science, we have to ensure that we do not overlook the unavoidable challenge of misconceptions.

Managing Misconceptions

Simply by experiencing the world around them, learners process and organize information from many sources (Rutherford & Ahlgren, 1990). As a result, they come to our science classes with already formed ideas