Learning Science *As* and *Through* Inquiry

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Inquiry science teaching has been at the heart of science education reform efforts for as long as most of us can remember. Clearly, the longstanding efforts to move science education in this direction are not a passing education fad. However, confusion often exists regarding what inquiry science teaching means and what it looks like in the complex world of classroom teaching. Inquiry science teaching may refer to teaching science as inquiry (helping students understand how scientific knowledge is developed) or teaching science through inquiry (having students take part in inquiry activities to help them come to more deeply understand science concepts). When done well, inquiry science teaching accomplishes both.

Well planned and effectively implemented inquiry experiences encourage students to be both mentally and physically engaged in ways that are not possible in other science education experiences. The decisions that students make when inquiring compel them to access their prior knowledge, apply it to the situation at hand, and assess their progress. All this requires extensive mental activity and reflects what we now know about how people learn science. Understanding how students learn and why they often struggle in learning what teachers intend is the foundation for effective teaching. Importantly, the decisions that students make in inquiry experiences and their rationales for those decisions provide teachers a window into students' thinking. This information is crucial for making appropriate pedagogical decisions that encourage students to question their prior thinking and move toward desired scientific understanding.

During science inquiry experiences, the teacher's role in student learning is far more critical, for without-well reasoned teacher intervention, students will become frustrated as they alone will rarely create meaning similar to that of the scientific community. Without a teacher's perceptive questioning and responding that plays off of students' observations, actions and thinking, what exists is analogous to a canvas with the appropriate paints and brushes nearby waiting for an artist to create beauty. The bottom line is that knowledgeable teachers are essential in effective inquiry science teaching. This is why inquiry articles appearing in ISTJ make explicit the crucial role of the teacher in promoting desired goals. Too often, education literature gives the mistaken impression that good inquiry activities alone are sufficient for effective teaching and learning. But even the best activities do not by themselves effectively teach students to reach the important goals we have for science education.

Creating effective inquiry science learning experiences is not easy, and the already overwhelming demands placed on teachers make difficult finding time and resources to implement effective inquiry experiences for students. This is why ISTJ exists—to provide assistance to science teachers looking for ideas and pedagogy that will improve student learning.

The first article in this issue of ISTJ describes a new state science education initiative in Iowa called “Every Learner Inquires”. This initiative is designed to encourage and help teachers across Iowa implement effective inquiry learning experiences for their students. The next two articles describe ways to engage students in learning science both as and through inquiry. The fourth article addresses the importance of making inquiry experiences accessible to all students including those with unique challenges. The final article in this issue, written by a middle school principal and former science teacher, addresses how administrators can and should support effective science teaching practices. We thank all the authors who have contributed to this and the first issue of the revived ISTJ, and encourage you to share your ideas with readers of the journal.