

*Another Advancement In*

# STEM Education



*Iowa State University informing decision-makers about research in Science–Technology–Engineering–Mathematics Education*

## **Improving science learning**

Lori Norton-Meier sees science as more than test tubes and lab reports. She approaches elementary classroom science in an entirely new manner, using creative thinking, writing, and literacy to expand students' knowledge and comprehension of the subject.

The Iowa Science Literacy Project (ISLP), and its main component, the Science Writing Heuristic (SWH), is a research study that was originally designed to measure the growth of middle school and secondary students' test scores in the science area. In 2004, Norton-Meier, an assistant professor of curriculum and instruction at Iowa State University, was brought into the project to investigate its use with elementary students (PreK-6th grade).

“We want to help kids think conceptually and think with the mind of a scientist,” Norton-Meier said. “So many of us have a ‘textbook’ knowledge of science, but in reality, scientists are much more active and involved. It’s interesting that when we rethink the way we teach science, we learn there is no science without language – teachers need to incorporate the values of language and literacy practices into science. The SWH approach builds upon what we know about good writing and helps students communicate what they know in a variety of ways.”

When a teacher uses the SWH approach, students are challenged to think and write creatively about their understanding and developing knowledge of science. Using a notebook instead of traditional lab reports, students expand what they learned during scientific experiments by asking beginning questions, learning



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how to make claims, providing supporting evidence, presenting and arguing the meaning of the findings, and reflecting on how their thinking has changed. Overall, it is an instructional approach that greatly changes the nature and impact of science-related classes for both students and instructors.

Norton-Meier and her research team have seen year-by-year jumps in science test scores when students learn science through the SWH approach. Although all students in high-implementation classrooms showed gains in science and language, research also shows that children receiving special education assistance and those living at the poverty level demonstrate the most significant gains. Over time, students' scores in the literacy component of basic skills tests also improve, leading researchers to conclude that the written knowledge may take more time to show gains than does the science knowledge.

### **For more information:**

Visit the Iowa Science University College of Human Sciences STEM education web site at [www.hs.iastate.edu/news/stem](http://www.hs.iastate.edu/news/stem) or contact Lori Norton-Meier, phone 515-294-1224, email [nortonme@iastate.edu](mailto:nortonme@iastate.edu).