

Brief Summary

Science and mathematics as disciplines offer us ways to make sense of the complexities of our world. But, to understand these ways of knowing is complex in its own right. This understanding requires more of learners than the basics of reading, writing and communicating. It demands a special sort of literacy and thus special instructional strategies within each of the disciplines.

South Carolina's Coalition for Mathematics & Science, in collaboration with S²TEM Centers SC (*Solutions for Science, Technology, Engineering, and Mathematics Education*), proposes a research and innovation program, ***Inquiring Minds: Reading to Learn and Innovate in Mathematics & Science*** (IQ-MS) to explore this special sort of literacy and uncomplicated its practices for middle grades teachers and their students. This "disciplinary literacy" effort is a direct response to national and state student achievement data, expert advisement and interest expressed by instructional leaders in our state's school districts.

Disciplinary literacy is an advanced form of literacy requiring adolescent readers to have specific background knowledge about how to read purposefully, engage in productive dialog and write in meaningful ways in the disciplines; skills not often taught in English/Language Arts classes or the content area classes themselves. Disciplinary Literacy instruction engages learners with content in ways that mirror what scientists and mathematicians do to inquire and gain understanding in their disciplines. These abilities to are essential to make sense of the complexities of the of science and mathematics.

The research aim of IQ-MS is to answer the following questions:

- What effect does professional development focused on disciplinary literacy strategies have on the instructional practices of middle grades mathematics and science teachers?
- To what extent does the application of disciplinary literacy strategies in mathematics and science classrooms improve student achievement in literacy?
- To what extent does the application of disciplinary literacy strategies in mathematics and science classroom improve student achievement in these content areas?

The innovation aims of IQ-MS are:

- To develop via iterative processes, a professional learning storyline for instructional improvement in mathematics and science through the application of disciplinary literacy strategies.
- To develop a robust virtual library of vetted, disciplinary literacy resource materials for middle grades teachers.
- To sustain and scale instructional innovation through regional networks of mentors and other champions for STEM education with a disciplinary literacy focus.

The targeted populations for this research and innovation development are middle grades (4th-8th) mathematics and science teachers and their students in 10 schools. These schools will be selected from applicants that meet specific criteria that include involvement of key school and district instructional leaders. These schools will be located, two each, in the five S²TEM Centers SC geographic regions.