P2. Making Sense of Science
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Making Sense of SCIENCE (MSS) is a professional development that prepares teachers for the new Common Core and Next Generation Science Standards through an inquiry-based learning experience that combines in-depth science learning with a focus on classroom practice, literacy support, and pedagogical reasoning. MSS builds on more than a decade of research and development by the Understanding Science for Teaching project at WestEd and has been shown in a series of rigorous national studies to strengthen teachers’ content knowledge, transform classroom practices, and boost student achievement—especially for low-achieving students, English learners, and students with poor literacy skills.

In short, Making Sense of SCIENCE courses help teachers:
* Learn major concepts of K-8 science
* Examine how children make sense of those concepts
* Analyze and improve their teaching practice
* Learn ways to support science learning through literacy

Every MSS course has two main components—a 30 hour summer institute (including, science, teaching, and literacy investigations), and a 10-hour school year follow-up that reinforces the learning from the core course and provides the opportunity to collaboratively examine student work from teachers’ classrooms. MSS courses support teachers’ use of their existing standards-based curricula for students, with courses targeting core topics of earth, life, and physical science (e.g., energy, organisms). MSS courses are rigorous, standards-based, and developed to align with the National Assessment of Educational Progress (NAEP) 2011 Standards, Project 2061 ATLAS of Science Literacy, American Association for the Advancement of Science (AAAS) Benchmarks for Science Literacy, and leading student curricula, such as FOSS and STC. A recent analysis also shows strong coverage of the Next Generation Science Standards in terms of the practices, cross-cutting issues, and core concepts.

Over the past decade, a series of increasingly rigorous quasi-experimental and experimental studies of the Making Sense of SCIENCE professional development model has documented its effects on the science achievement of high-needs K-8 students, including English learners and students with poor literacy skills. In every study, statistically significant differences were found favoring treatment teachers and students on measures of science content knowledge. Hierarchical linear modeling (HLM) analyses indicate that these gains were the result of teachers’ participation in Making Sense of SCIENCE professional development courses. Collectively, these data provide strong evidence of the internal validity of the professional development model. The data also offer strong evidence of external validity with respect to the model’s impact on increasing students’ achievement and closing achievement gaps across states, districts of varying sizes, with native English speakers and English learners, students with a range of S.E.S. backgrounds.

Effects on students have been shown to be statistically significant for all major demographic groups, with non-native English speakers gaining more than native speakers, and low-performing students making the biggest gains. Students whose teachers participate in MSS courses have been shown to outperform other students by more than 40 percent. MSS is unique in that these studies have shown a cascade of influence from teacher professional development to classroom practice to student achievement.