SESSION DESCRIPTIONS

MORNING PLENARY PRESENTATION

Implications of the Three-Dimension Vision of the NGSS
Joseph Krajcik, Michigan State University; Jonathan Osborne and Helen Quinn, Stanford University
This plenary will set the direction for sessions and discussions for the day-long meeting. Plenary presenters will tackle the challenge of how to develop a stable platform for learning, focusing on standards, curriculum, and assessment. Each presenter will bring his or her unique experience and scholarship to the discussion. A question-and-answer session will follow.

MORNING BREAKOUT SESSIONS

Creating an Inclusive Active Learning Culture in Science Education
Samantha Daley, CAST; Sybil Kelley and Dilafruz Williams, Portland State University
Engaging learners with a variety of background knowledge, academic skills, and social dynamics presents complexities for effective science instruction and NGSS implementation. Daley will share strategies for universally designing active, collaborative learning environments, providing feedback, structuring scaffolding, and supporting peer-to-peer interactions. Williams and Kelley will share curricular and instructional approaches that use learning gardens aligned with the NGSS to facilitate motivational engagement among racial and ethnic minority students in low-income schools.

Incorporating the Standards into Ecology and Environmental Science Classrooms
Barbara Nagle, Lawrence Hall of Science; Gillian Puttick, TERC
In this session, participants will explore the design of learning materials that were developed to align with the NGSS. Examples from NSF-funded middle school (Nagle) and high school (Puttick) ecology and environmental science curricula will introduce curriculum and professional development models that help teachers integrate core interdisciplinary science ideas with key science practices and cross-cutting concepts, and connect student thinking to the “big ideas.”

Supporting Teacher Learning in New Ways
Leema Berland, University of Wisconsin-Madison; Suzanna Loper, University of California, Berkeley
Two different but complimentary approaches for elementary and secondary teacher support frame this session. Loper shares multimedia educative curriculum materials that support teachers in teaching about scientific argumentation in the context of middle-grades earth and space science units. Berland shares research on student engagement in complex science practices such as argumentation, and explores how classroom culture and teachers influence student work. Both presenters recognize the substantial ways in which instruction must change and the need for innovative supports for teachers.

Supporting Adaptation of Curriculum Materials to Bring Three-Dimensional Teaching and Learning into K–12 Classrooms

Cynthia Passmore, University of California, Davis; Brian Reiser, Northwestern University

Currently, there are few instructional materials truly aligned with the NGSS three-dimensional teaching and learning. Teachers and schools face the challenge of evaluating, adapting, or developing their own curriculum materials. This session focuses on adapting, developing, and teaching with curriculum materials using storylines that articulate how teachers can elicit student questions in interactions with phenomena to help students incrementally construct explanatory models. Presenters draw on examples from NSF-funded research in instructional materials and professional development.

Teacher Professional Development in the Age of the NGSS

Sara Heredia, Exploratorium; Bethany Sjoberg, Highline Public Schools; Jessica Thompson, University of Washington

This session focuses on two professional development approaches to helping middle school and high school teachers develop an understanding of the standards and collaborate to address common problems of practice. Heredia will provide an overview of how Exploratorium's Teacher Institute has been adapting its professional development to address the changing instructional landscape. Thompson will speak about her work building Local Improvement Networks that support ambitious and equitable teaching practice.

Tools for Evaluating the Alignment of Instructional Materials with NGSS and Supporting Implementation

Aneesha Badrinarayan and Jennifer Childress, Achieve

The *Next Generation Science Standards* (NGSS) and the *Framework for K–12 Science Education* describe a new vision for science education. To support teachers, schools, districts, and states in the implementation of this new vision, the NGSS Network members have been working to develop several tools and resources. During this workshop, participants will explore these resources and try out tools for evaluating NGSS-alignment of lessons and units (EQuIP) as well as full curriculum programs (PEEC).

LUNCHTIME PLENARY PRESENTATION

Lessons Learned from Early NGSS Implementation

Kirk Brown, San Joaquin County Office of Education; David Campbell, National Science Foundation; Kathy DiRanna, WestEd; *Steven Schneider, WestEd; Maria Chiara Simani, CA Science Project; Craig Strang, Lawrence Hall of Science*

Districts implementing the NGSS face myriad challenges. This session focuses on lessons learned by organizations that are providing support to districts and schools involved in the early implementation of the NGSS. Presenters will discuss approaches to professional development for teachers and administrators to build capacity to implement the NGSS, standards-aligned instructional materials, tools, and assessments.

AFTERNOON BREAKOUT SESSIONS

Can We Enhance Our Curriculum with Cyberlearning Resources?

Jennifer Chiu, University of Virginia; Kathy Perkins, University of Colorado, Boulder; Jeremy Roschelle, SRI International

This session provides an overview of innovative learning technologies emerging through cyberlearning research. Presenters explore two resources: PhET simulations serve students in grade 3 through college and address physics, chemistry, math, biology, and earth science topics; WISE Engineering projects integrate math based on *Common Core* with NGSS science concepts combined with engineering design

pedagogy. Both exemplify how technology-enabled learning environments can address challenging learning goals while fitting within today's classrooms and extending existing instructional materials.

New Standards Bring New Expectations: A Look at the Convergence of Science and Literacy Across Grades K–12
Jacqueline Barber, Lawrence Hall of Science; Jacqueline Miller, Education Development Center, Inc.
With the *Next Generation Science Standards* and the *Common Core State Standards* for English Language Arts has come the convergence of expectations across science and literacy. The importance of making sense of informational text and the value of productive talk and written and oral scientific argumentation are now recognized as integral to science proficiency. Participants will hear about the approaches of two science programs and how they have embraced literacy in the context of science.

Creating and Experimenting with Models
Joseph Krajcik, Michigan State University; James Lester and Robert Taylor, North Carolina State University
Creating models is an essential aspect of doing science. Three presenters who work in two different locales and grade levels will share their current work, building upon past research and development projects. Krajcik will share experiences using a Web-based tool to create dynamic system models for making sense of phenomena. Lester and Taylor will focus on an intelligent cyberlearning system for interactive scientific modeling with multimedia interfaces, allowing students to create and experiment with interactive models of physical phenomena.

Technology-enhanced Assessments for Contemporary Science Classrooms
Christopher Harris, SRI International; Marcia Linn, University of California, Berkeley
Presenters report on recent advances in science assessment designed to help teachers and administrators improve their practice. Harris focuses on technology-supported classroom assessment for middle-grades physical science, assessment aligned with performance assessment, and evidence-centered design methodologies. Linn seeks assessments that serve as inquiry partners embedded in the Web-based Inquiry Science Environment (WISE). Taking advantage of natural language processing as well as analysis of graphs and drawings, Linn explores how automated scoring can augment inquiry instruction and help teachers optimize their guidance of students.

A Tale of Two Districts: Implementing the NGSS in Oakland and San Francisco
Caleb Cheung, Oakland Unified School District; Sarah Delaney, San Francisco Unified School District
Over the past few years, Oakland and San Francisco Unified School Districts have become state leaders in the implementation of the NGSS. Presenters will share their approaches to addressing the challenges of the NGSS to meet the needs of their teachers and students. Participants will learn about designing a districtwide science program, approaches to professional learning, grade-level challenges, and curriculum development. Questions and audience participation will be encouraged.

What Are the "Look Fors" to Assess the Quality of Instructional Materials in Light of the NGSS?
Jody Bintz and Daniel Edelson, Biological Science Curriculum Study (BSCS)
Recently, the NRC released the *Monitoring Progress* report that called for action from the STEM education community to better assess progress toward successful STEM education. BSCS responded to this call through their project *Developing Guidelines for Assessing the Quality of Instructional Materials and the Extent to Which They Exemplify the NGSS.* In this session, presenters explore the "look fors" in the draft guidelines by examining excerpts from sample instructional materials. We invite feedback on the *Guidelines*.