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A Conversation about National Science Standards in the United States: Next Generation Science Standards and a Framework for K-12 Science Education

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Framing the Conversation:

The motivation to create national educational standards in mathematics and science has occurred largely because of dismal US results in international benchmark test scores such as TIMMS and PISA. In addition, there is concern from many stakeholder groups that American productivity suffers as a result from a disjointed K-12 science educational structure. Despite an uneasy relationship between Federal and State governments, it is necessary to implement uniform educational policies among these entities and local educational agencies in order to create a coherent and cogent national dialogue on educational best practices and tangible educational outcomes in science education throughout the United States.

Framing the Charge:

Under the auspices of the National Academies, a Conceptual Framework for New Science Education Standards Committee has been created. The Academies provide "groundbreaking reports (that) help shape sound policies and advance the pursuit of science, engineering, and medicine." Its charge has been to create a scientific framework articulating "a broad set of expectations" for all US students. The committee determined the need for US students to know necessary scientific content in order to engage in scientific public discourse, possess necessary STEM (science, technology, engineering and math) related job skills and capture an inspiring motivation to continue learning in the sciences throughout their lifetime. By placing this charge with the National Academies, the federal, state and local educational community confirms their commitment of using sound, researched base objectivity in driving educational reform in American public schools.

Reframing the Conversation:

The structure of the document creates three significant themes embedded within the new scientific standards. These themes include the integration of scientific and engineering practices, crosscutting concepts highlighting the application of science and engineering and core ideas in physical, life and earth/space sciences. Additionally, the name, Next Generation Science Standards, creates a compelling, cutting edge vison that science instruction will positively impact future generations of American students.

Contrasts between the Old and New Standards:

An analysis of science content standards will contrast the new, soon to be adopted Next Generation Science Standards with previous and varied state-led efforts. The intent is to highlight the utilitarian nature of the new document with its laser-like focus on key scientific content. Additionally, the integration of the three themes (or dimensions) - practices, crosscutting concepts and core ideas - will be highlighted. Specific curriculum topics and materials showcasing water will be presented in order to show how the Next Generation Science Standards target the necessary scientific content while building capacity for engineering and technological skills across the K-12 educational spectrum thereby creating a Next Generation of American Science Students ready to reclaim American ingenuity and inspiration.