New K-12 science standards add focus on practices, engineering and early learning

May 21 2013, by Molly Mcelroy

(Phys.org) —The National Academy of Sciences recently released an updated national vision for K-12 science education learning goals. Known as the Next Generation Science Standards, the goals outline a vision for what all U.S. citizens should know about science.

The latest version, made public April 9, was developed by a national team with input from thousands of teachers, scientists and other stakeholders, including Philip Bell, director of the University of Washington's Institute for Science and Math Education and the College of Education, and Andrew Shouse, associate director of the institute.

Bell and Shouse are now advising schools, districts and states about how to implement the standards. They will host two public events May 22 to talk about the vision and the new standards with teachers, scientists, school administrators, parents and others interested in science education.

Bell answered questions about the new K-12 science education standards for UW Today.

Q: Why are science learning standards important?

A: Scientific literacy helps us all make better life choices and decisions. The learning standards set the baseline of what we should all know about science. We were very careful to make sure the learning goals help all youth become scientifically literate and college-ready, so they can

transition more seamlessly to college and have more choices about majors they can pursue.

Q: What do the standards look like?

A: There are three dimensions that help define the performances for each standard: disciplinary practices, core ideas of science and cross-cutting concepts that apply to multiple fields of science. The standards describe ways a student integrates these dimensions, but we didn't lay out specific ways to meet these learning goals, so there's still a lot of work to do in developing innovative curricula and instruction.

Q: What is different about the latest standards?

A: There are several major changes from the last incarnation of documents that have laid out standards for science education in the mid-1990s:

1. More emphasis on specific disciplinary practices used by scientists and engineers, such as developing and using a model, writing an argument from evidence, engaging in computational thinking and developing causal explanations about the natural world. The eight practices for science and engineering help focus what has previously been described as "inquiry" or "hands-on" instruction.

2. Greater focus on engineering and design. This is particularly important now that there's an increased emphasis on science, technology, mathematics and engineering and thinking about how to integrate those subjects to solve complex problems. And a greater emphasis on engineering in K-12 is especially important because of the technology industries in the state of Washington and the lack of qualified people for jobs in those fields.

3. More challenging goals for preschoolers and kindergarten students. Research studies show that our youngest learners are capable of thinking that's more complex than we previously believed, so the new standards have more ambitious learning goals for this age group.

Q: Won't this just be more work for teachers?

A: I have known many elementary school teachers who feel like they haven't had as much opportunity to teach science over the last decade because of the increased attention being given to reading, writing and mathematics. The new science standards have greater overlap with the existing standards for mathematics and English language arts so that teachers can teach science in ways that accomplish multiple goals. We hope this will make the lives of classroom teachers more manageable while allowing all students to meaningfully learn about science.

Q: Why should people who don't want a science career have to meet these standards?

A: The science standards help people develop core knowledge and ways of thinking that can be used in a broad variety of everyday situations and other careers, including the ability to skeptically critique information, build an argument based on evidence and design a solution to fit an everyday need.

Q: How are the standards put into action?

A: Each state will decide whether they'll try to adopt them and on what timeline. Washington state is working toward adoption, and my sense is there's a lot of excitement around embracing these standards. The state's Office of Superintendent of Public Instruction is coordinating the process of figuring out what the new science standards would mean for

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Q: Why are you excited about the new science learning goals?

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Provided by University of Washington

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