

# **Investing in the Improvement of Elementary Science in Washington State**

## Findings and Implications from a Study of K-5 Teachers Striving to Strengthen their Science Teaching

### **EXECUTIVE SUMMARY**

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The Center for Strengthening the Teaching Profession (CSTP) commissioned Inverness Research to undertake a study about what it takes for elementary teachers to strengthen their teaching of science. This report documents the perspectives and experiences of a selected pool of K-5 teachers, representing 67 districts, who are committed to improving their teaching and, in particular, are dedicated to get better at teaching science. It explains what motivates these teachers, what resources they need, what experiences they have and processes they undergo, and what barriers they encounter and surmount in their efforts to improve their science teaching. The report includes findings and recommendations that will help policy-makers and reform leaders support ongoing improvement of elementary science in Washington.

### **Key Findings**

#### TEACHER BACKGROUNDS

- Nearly all of the quite accomplished elementary teachers in the study have general academic training and little science background; yet most are responsible for teaching science. This is consistent with K-5 teachers across the nation.
- Although these teachers are more comfortable teaching subjects other than science, the majority say that over time, they have become comfortable teaching science.

#### CURRENT STATUS OF K-5 SCIENCE PROGRAMS

- Nearly all of these teachers are working in a school district that has an established kit-based (hands-on, inquiry-oriented) science curriculum. The kits have served as a vitally important foundation for teachers in developing the confidence they need to teach science.

- Teachers have varying degrees of district and/or school-level support for implementing the curriculum.
- Most of these teachers spend 1-2 hours per week on science. They think their peers spend about the same amount of time or a little less.

#### TEACHERS' TRAJECTORIES OF IMPROVEMENT

- For these teachers, improvement starts when they are motivated by their own personal belief in the importance of teaching science. Students' positive response to science reinforces teachers' motivation.
- Teachers "get science going" when they have access to science kits and receive training in how to implement the kits.
- Teachers move over time from "getting it going" toward "getting it good." By getting it good, they mean teaching science concepts and practices of inquiry more deeply and skillfully.
- Getting it good requires participating in high quality, science-rich professional development programs. It also involves developing a range of relationships with colleagues in their schools, other teachers they have met through professional development opportunities, university faculty, staff from external science improvement projects, and supportive district administrators.
- Some teachers eventually become recognized for their commitment to strengthening science and engage in teacher leadership roles and activities.
- Strengthening science teaching is a long-term, ongoing endeavor. Two-thirds of the teachers in this study have been working to develop their science teaching for from 4 to 10+ years.

#### CONDITIONS THAT SUPPORT TEACHERS IN STRENGTHENING THEIR SCIENCE TEACHING

- High quality professional development makes teachers feel both more prepared and more confident. Teachers seek programs from a wide range of sources that offer them science content and science-specific instructional strategies.
- Workplace-based opportunities to work on science together with colleagues enable teachers to hone their teaching skills and assess student work.

- The presence of a local science “champion”—a teacher, parent, or administrator who presses for more science—partially mitigates against the general weakness of science as a system priority.

#### CONDITIONS THAT CONSTRAIN THE STRENGTHENING OF SCIENCE TEACHING

- Teachers perceive that K-5 science is one of many competing priorities for improvement. Districts often send mixed messages, as in “Teach science if you can but don’t take time away from reading and math.” At the state level, the lone signal that science is a priority is the 5th grade WASL test.

### **Recommendations for Policy Makers**

Washington State has been working on educational improvement systematically since the early 1990’s. To its credit and with the support of NSF grants in several regions, the state has built what appears to be a sound foundational infrastructure for elementary science: high quality kit-based (hands on, inquiry-oriented) curriculum with basic teacher training in use of kits. This foundational infrastructure, which gets some science teaching started, is necessary, but not sufficient on its own, to strengthen elementary science education. Our study points to three policy actions that can make a difference:

#### *1. Sustain investment in foundational infrastructure of curriculum, kit resources, and kit training*

Classrooms across a range of districts are equipped with kit-based science teaching materials, and in most cases kits are accompanied by some amount of ESD, district, and/or school-based supports. It appears that science is being taught at least at a minimal level in many classrooms. It takes at least 4-5 years to build this level of foundation, and it is absolutely vital to sustain that investment over time.

#### *2. Raise and clarify the priority of elementary science*

All levels of the system must send a consistent message that science is, in fact, a high priority. In the absence of shared priority, improvement of science instruction relies on individual teacher commitment. State and local district leaders must convey the importance of science learning and assure that high-quality science teaching occurs regularly. Principals must promote the teaching of science, schedule for it, and support professional growth as new learning is put into practice

#### *3. Invest steadily in human capital*

Investments in teacher development, like other policy actions, are often sporadic or have short timelines; as such, they can be incongruent with the long-term growth trajectories of

teachers. Above and beyond kit trainings, teachers need a steady diet of three kinds of professional development in order to play their part in improving elementary science:

- (a) All teachers of science need professional development opportunities where they learn science content and science-specific teaching practices.
- (b) All teachers of science need systematic opportunities within their workplaces to work over time to put into practice what they learn.
- (c) Teachers who demonstrate leadership potential need professional development that builds their skills in facilitating science teaching improvement in their schools.