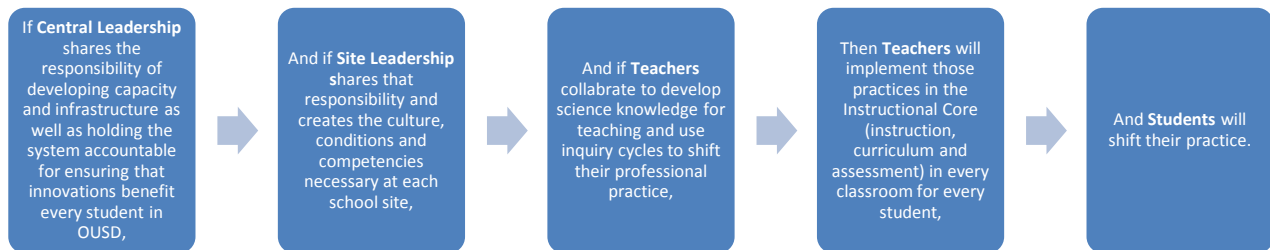


Oakland Unified School District's Model: Literacy for Science

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Support for literacy for science in Oakland Unified School District (OUSD) is systemic and driven by the Next Generation Science Standards (NGSS), which prepare students to graduate college, and be career and community ready. We hold quality science education as an issue of equity. Not only is it important for students to understand the world they live in and how things work, we must also prepare them to enter scientifically-informed communities in college and careers, including Science Technology Engineering Mathematics (STEM) careers.

We believe that...



History

Since the 1990's OUSD has been strengthening and expanding science education. Initial efforts provided teachers with professional development in inquiry-based science instruction and created a strong team of science teachers/advocates that sustained science instruction in elementary schools in spite of the English Language Arts (ELA) and mathematics testing and accountability pressures of No Child Left Behind (NCLB)¹. In 2007, the district adopted a kit-based K-5 science curriculum² and instituted a system for rotating the kits among elementary schools, providing every teacher access to fully stocked modules (including live organisms) at each grade level. This supported elementary science instruction but was not enough to guarantee science education for all K-12 students, so in May 2010, the Oakland School Board passed an Elementary Science Policy requiring weekly science instruction—a minimum of 60 minutes for grades K–2 and 90 minutes for grades 3–5. The policy standardized expectations for instructional time on a daily and weekly basis. The district also partnered with over 60 corporate foundations, public agencies, and community organizations to secure additional resources and expertise that generated an expanded science leadership team, resources to improve practices, and additional learning opportunities for students and educators.

Comprehensive District Reform

In June 2011, OUSD's Board adopted *Community Schools, Thriving Students, A Five Year Strategic Plan*³

¹Marx, R. W., & Harris, C. J. (2006). No Child Left Behind and science education: Opportunities, challenges, and risks. *The Elementary School Journal*, 106(5), 467-478.

² Full Option Science System (FOSS), a research-based science curriculum for grades K-8 developed at the Lawrence Hall of Science, University of California, Berkeley.

³ <http://www.thrivingstudents.org/sites/default/files/Community-Schools-Thriving-Students-Strategic-Plan.pdf>

that included a strong STEM strategy and increased graduation requirements for science. The state adopted the Common Core State Standards (CCSS) for ELA and Mathematics. At that time, the district directed its attention to support school-wide implementation of the new standards and the unit of change shifted from the individual teacher to the whole school staff. Oakland cascades capacity development from central leadership to the classroom teacher while focusing on the school as the unit of continuous improvement to ultimately impact student learning. Professional learning sessions are now conducted at school sites and it is a requirement that the whole staff including the principal attend. Central leadership recognized that it was imperative to strengthen principals' capacity to lead the science improvement charge at their school. Each year, elementary principals are required to devote 30 hours and secondary principals commit 5 hours to learning the science knowledge and pedagogy as well as leadership skills they need to support comprehensive science instruction. Principals and teacher leaders also participate in instructional rounds⁴ and consultations in partnership with science specialists and principal supervisors. Extensive video recordings of classroom instruction in science are used to help principals calibrate their observation lenses.

Roles and Responsibilities of Oakland's Science Department

The OUSD Science Department over the last two years has been supporting teachers around three focal areas: authentic use of language for making meaning, oral discourse to support academic language development, and writing in science using science notebooks. All of these have direct impact on conceptual understanding and language use within the Next Generation Science Standards by all learners and in particular for English Learners. The work started in elementary professional learning sessions and has been growing into secondary sessions.

In elementary science, teaching and learning cannot be separated from language or literacy development. We use language to learn and communicate concepts; it is active, not passive. *It's not about integrating science and ELA; it's about converging both into one.* Students are engaged in developing explanations of phenomena using discipline-specific discourse (science talk) and science notebooks. They work collaboratively in making meaning of their experiences. Students are engaged in argument from evidence, using "thinking maps" and other graphic organizers to make claims and counter-claims based on their reasoning and evidence. This sets the basis for the Science Writing Assessments that is administered district-wide. Academic vocabulary is introduced in the context of their activities, presenting science concepts as students experience the phenomena. Disciplinary vocabulary is defined in this context. Language and literacy objectives are made explicit as part of the science lessons. These include the concepts to be learned (content), the processes to be used to learn this content (practices), and how students will communicate their learning (literacy). Literacy and language support strategies are part of the lessons, such as: activating prior knowledge; using pictorials, charts, tables, to record data and explain phenomena; using writing to make their thinking explicit; and having students talk with one another or the whole class. Sentence starters and sentence frames are used as scaffolds to provide access. Reading strategies are used, such as analysis of complex text often found in textbooks and expository science texts.

In secondary science, learning focuses on explicit instruction of NGSS Practices with an emphasis on scientific evidenced-based argument. Daily oral and written discourse leading to rigorous argumentation based on evidence/data includes: scientific questioning, academic discourse, representations and

⁴ City, E. A., Elmore, R. F., Fiarman, S. E., & Teitel, L. (2009). *Instructional rounds in education*. Cambridge, MA: Harvard Education Press.

models, science writing, arguing claims, analyzing data, and organizing content as narrative. Summer Teacher Institutes focus on developing curriculum that activates the NGSS Practices with strong English language development supports embedded. Professional learning materials (Vital Student Actions of Science - 5x8 Card, Claims-Evidence-Reasoning Framework, rubrics, protocols, strategies, resources, videos)⁵ are used to build capacity in scientific evidence-based argument.

Science and Literacy Cohorts

To deepen practice and test implementation strategies, the district created the “Science and Literacy Cohorts,” which are groups of elementary schools (13 of 54) that opted to make continuous improvement in science the center of their instruction and learning. Teachers at these schools receive classroom coaching, site-based professional learning, and are invited to the district’s two-week science summer academies. These schools are committed to improving the quantity and quality of science instruction in all classrooms, increasing science teacher leadership capacity, and developing science resources and models for effective practices for the district. They are focused on literacy for science and issues of equity.

Building Sustainability

Part of building sustainability is to continue developing teacher leadership capacity. Every school site is required to have a designated Lead Science Teacher (LST). Previously the role of the LST was to coordinate the delivery of kits and materials. In the past three years, the role has evolved to a true leadership role, where LSTs receive additional leadership training and are expected to work closely with their principal monitoring implementation, conduct professional learning sessions and use data to improve instruction.

Instructional rounds and consultations enable assessment of science classroom practices. Science notebooks and projects as well as student work and participation in classrooms help leaders reflect on students’ performance regularly. The current summative assessment tools for science in California in 5th, 8th and 10th grades are not aligned to the NGSS; therefore, the district is working to create its own science assessments. Last year, Oakland’s science and English Language Arts (ELA) departments developed and rolled out an assessment called the Science Writing Task (SWT) for all 3rd-through-5th grade students. The SWT consists of five one-hour lessons that prepare students to write an opinion/reason-based essay grounded in concepts learned from science classes. The SWT assesses students based on the Common Core State Standards (CCSS) ELA writing standards for argumentation development and uses science as the context for that writing. This year, the development focus is on a more targeted science assessment that builds from the science and engineering practices.

Future Work

The Next Generation Science Standards adopted by the State in 2013 arrived on the heels of the CCSS in ELA and Mathematics. District leaders couldn’t ignore the compounding effect of the call for so much change in instruction across disciplines, especially for elementary teachers. A close examination of the standards evidences that in addition to the shifts in how content is organized and when it is studied there is a demand for engaging students in a set of powerful practices (see Venn diagram). Oakland decided to focus its 2013-2014 system-wide implementation of standards on three cross-disciplinary practices: comprehending complex text, academic discourse, and writing using evidence. The focus has enabled a reflective continuous improvement cycle on a discrete set of practices in alignment to the

⁵ <http://science.ousd.k12.ca.us/>

new standards that are building common understandings and new tools to meet multiple quality implementation challenges in each of the three disciplines: science, mathematics and ELA.



Practices.
3. EP1–EP6 represent CCSS for ELA “Practices” as defined by the ELPD Framework (p. 11).
4. EP7* represents CCSS for ELA student “capacity” (p. 7).

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