Integrated Science Units:
Alignment to the Next Generation Science Standards

Our Sample Unit Alignments

We are proud to present 3 sample NGSS alignments for your review. These alignments demonstrate how an integrated design can simultaneously be anchored in compelling contexts, fueled by ongoing professional development, competency- and performance-based, and flexible enough to encourage learner and teacher agency.

Each of our units last about 3 weeks, depending on school schedules. The sample unit alignments provided on our website include the following components:

- Summary Description: The text box at the top of the alignment narrates specific ways that the learning experiences

- A Table of Disciplinary Core Ideas (DCI's & CCC's): This table includes the DCI's relevant to the lab and also color-codes each DCI to the specific crosscutting concepts (CCC's) that tether the DCI directly to our learning experiences. The NGSS Performance Expectations (PE's) that align to both our unit and to the DCI are noted. For California, a separate table of PE's related to the CAST is included.

- A Table of Science and Engineering Practices: This table calls out the specific descriptions from the NRC Framework that directly relate to learning experiences in our lab.

Please note that our alignments include Middle School and High School indicators. Our assessment of the hundreds of schools we have worked with recently indicate that many high school programs are currently ready for MS and some HS indicators. Rest assured—as schools grow and students arrive to 8th grade ready to handle more, we will meet them at the door of the lab with increasingly challenging experiences! The pandemic has resulted in student science learning gaps that we are remedying through our designs.

The Integrated Science Journey: A Co-evolution

Many schools are wondering how to best work with the Next Generation Science Standards (NGSS), released in their current form in 2013. The standards are largely based on the work of the National Research Council's Framework for K-12 Science Education, which became available in their current form in 2011.

The Integrated Science Program dates back to 2002. So how, you might ask, is the Program relevant to NGSS and today's classrooms? Well, it seems as though we've all been referring to the same research, yet EduChange got a head start on the

implementation and professional development front. Between 2002-2008 we worked with 10 schools, over 40 teachers and over 2000 students across a wide diversity of demographics. In 2008 it was clear that schools were not quite ready to handle a full-blown digital delivery, which was always our vision (yes, even back in 2002 when people thought we were crazy—and there was no such thing as "Ed Tech"). We forged ahead anyway, supporting schools and waiting…patiently.

In 2011 we took our cue from the NRC and studied their Framework closely. Then we began updating, curating, and re-centering the materials to prepare for today's classrooms. Yes, the Framework and the NGSS were helpful. But so were *the 6 years of data we collected weekly inside real classrooms*. We challenge you to find another publisher who examines their own work as seriously, and prior to its release.

In June 2014 a group of researchers from the National Association for Research in Science Teaching (NARST) released a series entitled *Supporting the Implementation of NGSS through Research*. This call to action resonates harmoniously with our approach. Here are some of our team's favorite quotations:

From *Assessment*:
"Assessments should tap aspects of student knowledge that go beyond declarative and procedural knowledge, including assessments that focus on principles understanding (knowing why)."

From *Curriculum Materials*:
"Effective curriculum materials are coherent, rigorous, and focused on big ideas. These materials have lessons sequenced to unfold sensibly, with ideas building on one another toward the development of an integrated understanding and support for students to see the coherence (Roseman, Linn, & Koppal, 2008)."

From Professional Development:
"[Professional learning experiences] should also be embedded in the work of teaching: built on actual instructional and curriculum materials that can be used with students and that support the NGSS with fidelity. Professional learning should be collaborative and designed to engage a critical mass of teachers who are members of learning communities (Elmore, 2002; Garet, Porter, Desimone, Birman, & Suk Yoon, 2001; Wilson, 2013).

From Engineering:
"In a classroom where engineering activities support student learning of engineering practices and disciplinary core ideas….Students would then be working to understand the scientific principles upon which the challenge rests and applying these principles when generating ideas, as well as implementing and redesigning solutions…We would hear students comparing different design solutions as they analyze the data and information gathered…we would observe the teacher promoting STEM integration by explicitly spelling out science and mathematics concepts students are learning and scaffolding students' ability to transfer science learning to their design solutions."

Many thanks to the NARST researchers who articulated these and other powerful calls to action! We look forward to continuing our journey with schools around the world…