"A Growing Tradition"
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THE GOLDEN SLATE

The official newsletter of the California Agricultural Teachers' Association

Bridging the Gap: Turning NGSS Intent into Classroom Practice

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Visit an agriculture science classroom and you might find students "modeling" by copying diagrams of plant cells, digestive systems, or labeling parts of plants. But is this really modeling?

In the context of the Next Generation Science Standards (NGSS), modeling is something deeper. It is more than reproducing a diagram from a textbook or Google search; it is about representing and explaining real-world phenomena or predicting outcomes. For example, instead of simply drawing sand, silt, and clay particles, students might develop a model explaining differences in water percolation between two areas of the same field. In that case, students are not just labeling. They are making sense of a phenomenon and demonstrating their understanding at a deeper level.

This shift matters. It aligns with NGSS, but it is also deeply rooted in the foundation of agricultural education: learning by doing. It raises an important question: Are we engaging students in agriscience, or are we teaching about it?

As agricultural educators, we are uniquely positioned to prepare scientifically literate students who can advocate for agriculture and pursue STEM-related careers. Moving from learning about agriscience to engaging in agriscience is a subtle but powerful shift, one that promotes critical thinking, collaboration, and real-world problem solving.

To better understand where we are as a profession, we conducted a statewide study of California agriculture teachers examining how often NGSS-aligned practices are used and how confident teachers feel implementing phenomenon-driven instruction. Here's what we learned.

We have a strong foundation.
Teachers are already doing many things well. SBAE classrooms frequently connect learning to real-world applications and build on students' prior knowledge. Agriculture is a natural context for science, which positions our programs well for NGSS alignment.

We still have work to do.
Instruction still leans toward teacher-centered approaches: lecture-heavy lessons, step-by-step labs, and modeling focused on replication rather than sensemaking. Practices requiring higher levels of student thinking, like designing investigations, developing models, and explaining phenomena, are used less frequently.

Confidence drives practice.
Teachers who feel more confident using phenomenon-driven instruction are significantly more likely to engage students in NGSS Science and Engineering Practices. In other words, when confidence increases, so does the depth of student learning.

What does this mean for us?
Agricultural education has always been about preparing the next generation of problem-solvers. NGSS does not change that mission; it strengthens it. Even small instructional shifts can have a big impact: starting with a real-world phenomenon instead of a definition, letting students ask questions instead of providing them, and asking students to explain why, not just what. These moves position students as active participants in their learning, not just recipients of information.

Where do we go from here?
We do not need to overhaul everything we do; we need to intentionally deepen what we already do well. By shifting toward more student-driven learning, we can ensure our programs continue to lead in preparing students for careers in agriculture, STEM, and beyond.

The opportunity is already in our classrooms. The question is, how will we keep pushing ourselves?

Interested in learning more about the study?
Presentation: Next Gen Agriscience: Examining NGSS-Aligned and Phenomenon-Driven Instruction Self-Efficacy in School-Based Agricultural Education (LINK)

Poster: Embracing Phenomena: Understanding SBAE Teachers' Confidence and Use of Phenomenon-Based Learning (LINK)

Poster: NGSS Disciplinary Core Ideas: What Are Our Needs? (LINK)