HMH Science Dimensions®

ENGINEERED for the Next Generation

Transition to an NGSS Elementary Classroom

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Most elementary teachers are aware of the Next Generation Science Standards* (NGSS). Because the NGSS are still relatively new, though, those same teachers are less familiar with what constitutes effective NGSS teaching.

Before exploring effective instruction, it is vital to understand that the NGSS are far more than a new order of topics by grade level. They represent an entirely different approach to learning and teaching, one that focuses much less on the teacher delivering content and information and much more on students constructing understanding through their own experiences.

SCIENTIFIC EXPLANATION

Good NGSS lessons have a strong base in observation of real-world events. A lesson typically begins with a phenomenon—for example, a short animation reporting a sudden decline in the owl population at a local park. Students are tasked with constructing a scientific explanation of the disappearing owls and what might enable the owl population to rebound.

The core of the lesson provides a mix of hands-on and research learning experiences. Through exploration, students gather clues and evidence. By the end of the lesson, students can propose an explanation and support it with evidence plus their reasoning.

Vocabulary is still relevant but not the focus or goal. The emphasis is on applying the concepts to explain rather than memorizing terms and their definitions.

STUDENT-CENTERED LEARNING

Whole-class lecture instruction is much rarer in an NGSS classroom. Students are self-directed, active explorers. Curiosity drives them to pursue different learning experiences guided by their own questions and by thought-provoking teacher questions. For this reason, the print and digital materials for *HMH Science Dimensions* provide a balance of quick activities, hands-on explorations, thought-provoking questions, and content reading. The goal is to provide evidence students can use to build their understanding of the scientific practices, content, and crosscutting connections needed to explain a phenomenon or solve an engineering problem.

FORMATIVE ASSESSMENT

In *HMH Science Dimensions*, there is no rigid separation between learning and formative assessment. Students constantly move back and forth between explorations and answering questions to guide their explanations. These learning experiences, especially the questions, reveal students' levels of understanding of the science of the phenomenon.

OPEN-ENDED INVESTIGATIONS

A cookbook is a collection of step-by-step recipes. Highly prescribed, these recipes offer processes intended to produce consistent outcomes. Minimal understanding of cooking concepts is needed to produce a tasty dish.

Until recently, nearly all student hands-on explorations were cookbook-like—that is, performed by closely adhering to a series of explicit steps. It was an orderly process, but conducting explorations that way didn't provide the most meaningful results for students. Basically, every student performed the activity in exactly the same way, through a common and constrained process. Ideally, all arrived at the same results. In fact, students were often assessed on how well they didn't deviate from the prescribed actions. There was little opportunity for thinking creatively, planning alternative strategies, experimenting, or otherwise testing ideas—all important skills for real scientists and engineers.

NGSS advocates engaging students in active learning experiences. Students—not the textbook, not the teacher, but all students—assume the roles of scientists and engineers. For example, in Grade 5 of *HMH Science Dimensions*, students choose an ecosystem and design their own model of the relationships within it. Perhaps they model it as a poster with string connecting the organisms, as a diorama, or even as a short computer animation. The emphasis is shifted away from having everyone follow the same steps in the same way. Instead, the goal is ensuring that students recognize and model the underlying concepts and principles shown by the relationships in their chosen ecosystem.

Similarly, the You Solve It online simulations are open-ended. Students can observe how their choices affect outcomes and even try more than one approach. Often students learn more when they get unexpected results. This leads them to consider what they might do differently.

When students are not presented with a checklist of rigid and universal steps, they are freed to think. They are placed in an open-ended situation where they are challenged to construct understanding through planning, designing, performing, and analyzing results of their own investigations.

"ALL STANDARDS, ALL STUDENTS"

Another focus of NGSS is ensuring that ALL students have access to rich learning experiences in science. *HMH Science Dimensions* provides a wide variety of simple hands-on activities. In addition, the teacher materials provide tips for how to scaffold each activity so students of different ability levels can experience it.

CUSTOMIZABLE LEARNING

HMH Science Dimensions was built from the ground up to help you reach the goals set by the NGSS. It is based on a flexible approach that is easily customized for all learners. With the options and supports built into the program, you will be able to transition to this powerful new approach to teaching and learning in your classroom.

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