

## Building Classroom Objectives from the 2010 Science Standards of Learning Seven Strategic Points about the Standards and Curriculum Development

**1. The “stem” of each science standard, along with the bulleted “key concepts,” defines the standard.** The stem provides the intent of the standard; the bulleted key concepts lay out a minimum “footprint” for the context of the stem. *Note: First, know what the stem by itself is asking. Do not focus on the bulleted concepts without understanding the intent of the stem.*

**2. In the phrase “investigate and understand,” *investigate* subsumes categories of science skills and practices with performance descriptions defined at each grade.** Investigate refers to scientific methodology and implies systematic use of certain inquiry practices. The skills are packaged in the science standards as the “Scientific Investigation, Reasoning, and Logic” strand (X.1) for each grade or subject. These skills and practices should be built into division curricula and classroom objectives. *Note: Investigating requires students to engage in the verb “science” actively. However, inquiry does not always involve the manipulation of laboratory materials, and good instruction is more than “hands on.”*

**3. In the phrase “investigate and understand,” *understand* subsumes a range of cognitive actions from recall to the critique and synthesis of information.** *Understand* as used by the science standards is clearly not limited to comprehension, and curriculum and classroom objectives must reflect a spectrum of student cognitive outcomes. *Note: The intent of the standards is higher-level thinking, both in the inquiry skills and practices and in learning expectations.*

**4. Standards from the “Scientific Investigation, Reasoning, and Logic” strand (.1) are intended to be achieved in the context of all other standards.** These skills can be taught discretely, but it is intended that they are learned in the context of specific science content. *Note: Teachers should be knowledgeable of the specific skills and practices that come before and after a grade/course.*

**5. The skills and practices in “Scientific Investigation, Reasoning, and Logic” standards “ascend, plateau, and ascend” throughout the sequence from kindergarten through the high school courses.** In this strand, there are clusters of skills and practices, from *observing to data analysis and experimentation*. If expectations don’t ascend from the previous grade level (i.e., they plateau), the skill may not be included in that specific X.1 standard. *Note: For all grades or subjects, students are expected a) be developing fluency with or b) to have mastered the science skills and practices that came before at earlier grades.*

**6. Individual standards are not intended to be unit objectives.** Certain standards may define some/much of the content of an instructional unit, but in many cases, several other standards at a grade level or subject need to be considered when organizing curriculum and defining classroom objectives. In virtually every situation, the X.1 standard must be incorporated. *Note: Restating the Curriculum Framework is not a curriculum.*

**7. The standards do not explicitly define everything that teachers should teach and students should learn in science.** The Curriculum Framework unpacks the standards by providing additional detail and examples; however, it does not define everything important in a learning progression. *Note: Teachers/curriculum developers must exploit all opportunities to go beyond the standard, especially when integrating skills and concepts in science with other discipline areas.*