

# Instruction

## Philosophy and Important Principles

Accomplished teachers have deep science content knowledge and specific pedagogical content knowledge that they apply to provide high-quality instruction. Accomplished teachers use instructional strategies that match the thinking required by the curriculum and the needs of the students. Teachers are able to make connections between the curriculum and students' prior experiences, prior knowledge, and everyday understandings.

Accomplished science teachers draw on their knowledge of crosscutting principles such as patterns of change and cycles to help students identify connections across science disciplines. Teachers make learning relevant by connecting science lessons to current or historical events. Accomplished science teachers realize that the process of making meaningful connections supports conceptual understandings that help develop the unifying concepts of science.

Accomplished science teachers mirror the processes that scientists use in their efforts to understand the world; by doing so, teachers help students develop an understanding of how scientific knowledge is generated. Teachers guide students to develop the habits of mind of scientists, the capability to engage in scientific inquiry, and the skills to reason in a scientific context. Accomplished teachers understand that, ultimately, students should be able to hypothesize, model, develop explanations from evidence, and engage in scientific discourse. Students should also become critical consumers of scientific information. (See [Standard II—Knowledge of Science](#).)

Accomplished science teachers instruct their students in scientific inquiry. Teachers realize that establishing an inquiry-based classroom helps students develop deep understandings of science and a sense of ownership over their own learning. Accomplished teachers foster their students' intellectual independence—at first, modeling and demonstrating thought processes for students, and gradually making way for increasingly student-generated questions. Teachers understand that self-directed learners become more effective lifelong learners. Accomplished teachers also understand that students' ability to apply knowledge to novel situations is directly related to the depth of their understanding of what they have learned.