



## A Teaching Framework to Reflect a New Vision

### Use a three-stranded curriculum

The new vision of science education describes three aspects (strands) of science learning that the learner experiences simultaneously. The result is a deep understanding of (1) a limited number of disciplinary core science ideas and (2) crosscutting concepts that students learn through (3) the practices of science and engineering.

The Focus on Energy classroom learning activities address a disciplinary core idea, *Energy*, a cross-cutting concept *Energy and Matter: Flows, Cycles, and Conservation*, and multiple scientific practices with particular emphasis on *Developing and Using Models* and *Engaging in Argument from Evidence*. The three strands are learned together. Each learning experience builds on the one before so that students systematically increase their understanding of the core energy ideas and concepts and they become more skillful using each of the practices.

Classroom learning activities have a simple three-part structure: Ask a question, Explore or Investigate a phenomenon, and, finally, Make Meaning.

### Support students as they use the practices of science to learn about energy

- **Lead with a question.** Science begins with questions about the natural world. Each Focus on Energy learning activity is built around an investigation question that guides activities and discussions and leads students to a deeper understanding of energy. A good investigation question shines a spotlight on a targeted energy idea and the practices students use to explore and better understand the idea.
- **Elicit ideas.** All students have ideas and experiences about energy that are resources for learning. Listen carefully to students as they respond to elicitation questions or take part in discussions that are included in each learning activity. Read their notebook entries. Build on these resources as you make teaching decisions.
- **Highlight evidence.** In the new vision of science education, students understand that science relies on evidence to answer questions. As you plan your lessons, make sure the goal is clear and that there are opportunities for students to collect the evidence they need to support their claims. Encourage students to use their observations to support their energy stories.
- **Encourage and support students' use of representations.** Energy is abstract and cannot be measured directly and so presents a challenge for teaching and learning in elementary school. Introduce multiple standardized and invented representations (e.g., energy bars, energy cubes, energy theater, flow diagrams) that will help students to reason about energy flow in a wide range of scenarios and communicate their thinking to others.
- **Focus on making meaning.** It is essential to provide time for students to make meaning of their classroom work. In addition to reflective writing, this requires social interaction and discourse as everyday classroom activities. Plan small group and full class meaning making discussions where students share their thinking and reasoning, co-construct evidence-based claims and collaborate on developing a model of energy.