Connecting to Standards

The Eight Science and Engineering Practices

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

An example from Chapter 19, "Imaginative Inventions," students explore the engineering design process by learning about inventions throughout history and how inventions fill wants or needs. Then, they are immersed in the practices of engineers as they come up with a way to improve a common invention. Finally, they further their understanding of the design process by testing toys and eventually designing their own toy.

Picture-Perfect Science Lessons engages students in these science and engineering practices to capture their interest, motivate their continued study, and, above all, instill in them a sense of wonder about the natural and designed world. By actually doing science and engineering rather than merely learning about it, students will recognize that the work of scientists and engineers is a creative and rewarding endeavor that deeply affects the world in which they live.

Disciplinary Core Ideas

1. Physical Sciences
2. Life Sciences
3. Earth and Space Sciences
4. Engineering, Technology, and Applications of Science

At the beginning of each lesson, the authors of PPS provide the disciplinary core idea the lesson addresses, as well as the grade levels the lesson targets.

Crosscutting Concepts

1. Patterns
2. Cause and Effect
3. Scale, Proportion, and Quantity
4. Systems and System Models
5. Energy and Matter
6. Structure and Function
7. Stability and Change

In Chapter 14, "Roller Coasters," students use a model roller coaster to explore the cause-and-effect relationship between forces and motion.

In Chapter 13, "The Magnetic Dog," students learn that if an object contains iron, it is attracted to a magnet.