

A Vision for Science Education

Science is a way of making sense of the natural world. Scientists seek to describe its complexity, to explain its systems and events, and to find the patterns that allow for predictions. Science is the basis for the design of technologies that solve real-world problems.

Not all students will become scientists or engineers. But science and technology occupy ever-expanding places in our everyday lives. As citizens, we are asked to make decisions about social issues that involve science and technology. As workers, we have occupations that increasingly involve science and technology. In the 21st century, adults will need to be comfortable and competent in a complex scientific and technological world.

Schools have the responsibility of preparing students for the future. Schools must prepare all students—regardless of their future aspirations—to be scientifically literate. Therefore, all graduates of our schools should be

- knowledgeable about the important concepts and theories of the three major branches of scientific study: earth, life, and physical sciences;
- able to think scientifically and use scientific knowledge to make decisions about real—world problems;
- able to construct new knowledge for themselves through research, reading, and discussion;
- familiar with the natural world, and respectful of its unity, diversity, and fragility;
- able to make informed judgments on statements and debates claiming to have a scientific basis;
- able to reflect in an informed way on the role of science in human affairs.

This kind of literacy in science does not come easily.

The science teaching of the past, with its pattern of monotonous lecturing, note—taking, and scattered lab experiences, will not help students build a deep, coherent understanding.

Teaching students to become literate in science is more about asking them questions and helping them find answers than telling them everything they need to know.

What would it look like to teach science this way? Imagine a classroom where students are excited about science, not fearing its complexity. A classroom where teachers pose challenging and developmentally appropriate problems for students, help them set up relevant investigations and encourage them to think about what the results of these investigations mean. Where teachers explain science concepts to students, but only in the context of investigations, when explanations are most meaningful. In this classroom, teachers often say "What would happen if...?", "How can we find out?", "Why do you think this happens?", and "Why do you believe that?"

Students do much of the talking in this classroom. They ask questions. They collaborate with each other when setting up and conducting investigations. They make predictions. They discuss what certain results mean. They articulate their own ideas about how things work and why things happen. These classrooms are intellectually stimulating and active places. Students are constructing ideas about how the world works.

A curriculum for literacy in science helps students make sense of the world around them. It helps students apply their knowledge of science to everyday phenomena, systems and events. It respects and values the growth of students' understanding and does everything possible to nurture it.