

Science Curriculum Inc.

L A K E W O O D , C O L O R A D O

Supporting IPS-A Model That Works

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With the advent of standards, most school districts have had to reexamine their K-12 science programs. In Jefferson County (Jeffco), a large metropolitan school district, we started this process five years ago. One of the initial steps was to review the scope and sequence, confirming who would be teaching what at each grade level and identifying instructional materials that would support the intended student learning. After a thorough review of middle-school materials, we selected *IPS* for use with our eighth grade-students.

IPS had once been widely used in Jeffco, but over the years the county's schools had drifted to other programs. Many people were surprised when they learned that *IPS* was once again the program of choice. Now that we are several years into the re-implementation of *IPS*, it is appropriate to reflect and ask, "What have we learned along the way?" In this article, we share the process we're using and describe how it is working for us.

Be Clear about Why *IPS* Was Chosen

Teachers, parents, and administrators need to understand what good science looks like. The importance of focusing on fewer concepts—the key concepts necessary for a solid understanding of science—needs to be stressed continually. We also need to communicate how this understanding is developed over time based on students' own experimental and analytic work. And, most importantly, we need to distinguish between strong science lessons and "pseudoscience" activities, activities that use the vocabulary of science but have little to do with real science.

When explaining the decision to use *IPS*, we had to be prepared to illustrate the difference between literacy units and science. It is not that we do not value literacy, but it is all too easy to lose the science in vocabulary, paragraph structure, reading strategies, and library research. The best way to learn science is not by reading long passages in textbooks or by writing papers based on library and/or internet research but by collecting and analyzing data, looking for patterns, and reflecting on the investigations. Stating this message is not enough, it needs to be modeled in a quality program.

Provide Plenty of Support in the Beginning

Every teacher who is assigned to teach eighth-grade science is strongly encouraged to attend the two-week *IPS* summer workshop. Given that Jeffco has about sixty eighth-grade teachers, this is no small feat—but quality staff development is a key to successful

implementation. Without training, the first year of teaching any new program can be especially frustrating, and *IPS* is very different from traditional science programs. The training helps teachers understand the philosophy of the program, the overall "story line" of the course, and the key concepts that are the focus of each chapter. The two weeks of training provides the time teachers need to become familiar with the student text and consider what they need to do to use it effectively in the classroom.

Lack of access to equipment and materials can be a major obstacle when teaching science. We try to circumvent this by making sure that every classroom has at least one class set of texts, the necessary equipment (peg boards and balances!), and enough chemicals for the first year.

People often question the costs. They wonder, "How can you afford to offer all that training and pay for equipment?" To put it bluntly, we can't afford not to. If there isn't funding to implement and support a new program, the program will die. The central science budget isn't adequate to take on this expense, but Eisenhower monies, along with credit from SCI toward workshop tuition, provide the necessary funding. (To encourage participation in the workshop, SCI sets aside 5% of the purchase price of the *IPS* print materials as credit toward the training costs.) In the long run, the investment pays.

Offer On-Going Support

Even after teachers have taken the workshop, on-going support is essential. We try to make sure this support is varied and frequent. Some of the activities going on in Jeffco include the following:

- **Monthly meetings.** The last Monday of the month, for two hours after school, the *IPS* study group meets. The group consists of *IPS* teachers, but interested administrators, as well as other teachers, are welcome to attend as well. At this time, the teachers share successes and challenges, equipment and supplies needs are addressed, and we preview the next section of the program. Time is also spent on ways to help students connect the concepts with the "real world." This may be in the form of additional investigations, demonstrations, readings, or connections with the Earth and Life sciences. Most classes make it through Chapter 6 or 7 before the end of the year, but Chapter 9 is our goal, so students will be introduced to the atomic model. This means that pacing also has to be considered. These discussions deepen our understanding of the program and allow teachers to take ownership of what they are teaching.
- **Full-day inservice.** Three or four times during the year, all eighth-grade science teachers are provided with substitutes so they can meet to share experiences and focus on instructional issues. Topics might include looking at student work, the importance and use of graphing, setting up a safe learning environment, or helping students write quality answers to the questions that are built into the program.
- **One-on-one support.** Teachers know they can call us with questions whenever they need help. These questions run the gamut from ordering materials to disposing of chemicals, from addressing students' questions to preparing for parents' night. Teachers might want someone to meet with them during their planning time or they may be looking for coaching. No matter what the question is, teachers know that someone is there to help.

- **Teacher-to-teacher interactions.** One consequence of holding so many meetings is that teachers have gotten to know one other. We have built trust and can share experiences, talk about ways to address problems, and reflect on ways to improve instruction.

Common to all these activities is continued encouragement and emphasis on the major concepts students are learning. It takes time to develop an understanding of how programs such as *IPS* help students develop a deep understanding of science.

Evidence of Success Is a Bonus

Generally, success is measured at the classroom level. Each teacher talks about the satisfaction of seeing the "light bulb go on" as their students come to understand the science concepts. For the last several years, we have also undertaken a district-wide assessment. At several points during the school year, all teachers assign the same assessment instruments so we can see how well our students are understanding the big ideas. From one assessment to the next, teachers see evidence that their students are making progress in doing science as well. The first assessment focuses on conservation of matter, the second on characteristic properties, and (eventually) the final one will encompass the atomic model. Few, if any, of the questions are at the recall level. Some of the questions come from the *IPS* assessment package, others are from the TIMSS and NAEP released items, and some we write ourselves.

Each assessment takes two days and has three parts—a performance task, multiple-choice questions, and short-answer questions. These assessments were intended to help prepare students for the Colorado state science assessment, first administered to all eighth-grade students in the spring of 2000. While the assessments still serve this purpose, they have also helped to create a district vision of what good science instruction looks like.

The questions provide teachers with examples of what students should know and be able to do. When teachers meet to write the scoring guides for the performance task and short-answer questions, they look at student work and talk about their expectations. At the same time, they clarify their own understanding and find out where students are struggling. Everyone comes together to score the written portion of the test—teachers, administrators (not all, but a few), and others with an interest in science education, including parents with a science background and teachers throughout the system. Student learning is no longer a private matter. We all have a sense of how "our" students are doing. It is especially gratifying when we see progress from one test to the next.

By providing the same level of support at all grade levels that is now offered to *IPS* teachers, we will assure our students a strong K-12 science program.