

RESOURCES

Help for Teachers

Making Connections with Literature

Using literature as a supplement and enhancement for instruction is good teaching practice because:

- Children learn from everything they experience.
- Children learn more effectively when instruction is associated with positive emotions, such as those evoked by a good book.
- Literacy is key to children's success as learners.
- There are many different learning styles.

We encourage you to incorporate books of all kinds into your work with *Signs, Symbols, and Codes*. We've included an annotated list of quality books on the following pages. They include storybooks that demonstrate the benefits of understanding and using signs and symbols; and nonfiction books on how signs and symbols play multiple roles in our daily lives.

But don't stop with these. You know your students and you know better than anyone else how they learn. When you see a book that might further your instructional goals, interest or challenge a particular student, or evoke feelings that make learning more fun, add it to the books that are available to your students.

Signs, Symbols, and Codes

Alvin's Secret Code, by Clifford B. Hicks. Penguin Putnam Books for Young Readers: New York 1998.

(Recommended grades: 3-6)

Twelve-year-old Alvin and his best friend Shoie use their knowledge of codes and ciphers to solve a dangerous mystery.

Angela's Top-Secret Computer Club, by Holly Keller. Greenwillow Books: New York, 1998.

(Recommended grades: 2-6)

Angela and her friends in the top-secret Computer Club use their knowledge of computers, codes, and e-mail, to discover who is causing all the problems with the school computer.

A Caribou Alphabet, by Mary Beth Owens. Farrar, Straus & Giroux: Brunswick, ME, 1990.

(Recommended grades: K-3)

This innovative alphabet book, inspired by the Maine Caribou Transport Project, captures the beautiful world of the caribou, from "A" for antlers to "Z" for below-zero weather.

The Case of the Backyard Treasure, by Joanne Rocklin. Scholastic, Inc.: New York, 1998.

(Recommended grades: 2-5)

Liz the Whiz and her younger brother use codes, a chart, and a map of the backyard, to solve Zack's mystery.

The Case of the Mysterious Codes, by John F. Warner and Peggy Nicholson. The Lerner Publishing Group: Minneapolis, MN, 1994. (Recommended grades: 3-6)

"The Cas crackers," an ethnically diverse group of children, solve mysteries in and around Newport, Rhode Island. These sharp young detectives use logical deductions and powers of observation to get to the bottom of things.

Diadem – Book of Signs, by John Peel. Scholastic, Inc.: New York, 1997.

(Recommended grades: 4-6)

This is the incredible story of the adventures of Score, Renald, and Pixel on the planet Rawn. There are codes, mysterious symbols, and suspense, as the trio track down a magician who can change both shape and form.

Garrett Morgan, Inventor, by Garnet N. Jackson. Modern Curriculum: Cleveland, 1992.

(Recommended grades: K-4)

A brief biography of the African American inventor. It describes in rhyming text how his lifelong interest in machines led to the invention of the traffic signal.

Handtalk School, by Mary B. Miller. Simon & Schuster Children's Books: New York, 1991.

(Recommended grades: K-5)

Words and sign language depict a group of students involved in putting on a Thanksgiving play at a school for hearing impaired children.

The House of Dies Drear, by Virginia Hamilton. Macmillan Publishing: New York, 1984.

(Recommended grades: 6 and up)

A black family tries to unravel the secrets of their new home, which was once a stop on the Underground Railroad. The signs, symbols, and codes, and the figurative language, make this an exciting book to read.

I Have a Sister—My Sister Is Deaf, by Jeanne Whitehouse. HarperCollins Children's Books: New York, 1984.

(Recommend grades K-3)

Using only her face and shoulders, she says things that many people cannot say with words. She reads people's expressions to learn things she cannot hear.

Indian Signals and Sign Language, by George Fronval. Random House Publishing: New York, 1985.

(Recommended grades: All)

Full-color photographs and text describe nonverbal symbols used by the Native Americans of the Great Plains. The book includes more than 800 signs, smoke signals, picture writing, and the language of feathers and body paint.

I Read Signs, by Tana Hoban. William Morrow & Co.: New York, 1987.

(Recommended grades: PreK-2)

Uses photos to introduce signs and symbols frequently seen along the street. Young children recognize these words long before they are taught to read.

I Read Symbols, by Tana Hoban. Greenwillow Books: New York, 1996.

(Recommended grades: PreK-2)

Symbols are everywhere, and children don't need to read to understand this universal language. This book depicts many signs and symbols frequently seen along the highway.

I See a Sign, by Lars Klove. Simon & Schuster Children's Books: New York, 1996.

(Recommended grades: K-4)

WALK. STOP. ONE WAY. These are often the first words that children learn to read on their own. This book features full-color photos of the signs, and simply written text.

Jessi's Secret Language (The Baby-Sitters Club Series #16), by Ann M. Martin. Scholastic, Inc.: New York, 1996.

(Recommended grades: 4-6)

As the only African American in her sixth grade class, Jessi gains a sense of belonging by participating in the Baby-Sitters Club. She learns sign language in order to communicate with a hearing impaired child.

Maps and Symbols, by Angela Royston. Raintree Steck Vaughn Publishers: Austin, TX, 1999.

(Recommended grades: 2-6 and teacher reference)

This book tells all about maps and explains how mapmakers use symbols to pack in all kinds of information.

Signs, Symbols, and Codes

Marshal Matt and the Case of the Secret Code, by Nancy I. Sanders. Concordia Publishing House, 1997.

(Recommended grades: K-3)

Janie loses her new gloves while sleigh riding with her friends. Marshall Matt and Janie then go on an all-out search for Janie's new gloves. Together they find plenty of secret code messages, clues, and confusion!

Me on the Map, by Joan Sweeney. Crown Publishing: New York, 1998.

(Recommended grades: K-3)

A child introduces the world of cartography. Based on the idea that simple drawings can be maps, the book begins with crayon drawings of the floor plans of a girl's room and house. She describes how her room, her house, her town, her state, and her country appear on a map of her world.

Money, Money, Money: The Meaning of the Art and Symbols on United States Paper Currency, by Nancy Winslow Parker. HarperCollins Publishers, Inc.: New York, 1995. (Recommended grades: 1-6)

A short course in American history, focusing on the signs and symbols you can find in your wallet. The author explains the symbols that appear on U.S. paper currency, from \$1 to \$100,000.

More Simple Signs, by Cindy Wheeler. Viking Penguin: New York, 1998.

(Recommended grades: PreK-2)

Children usually have a lot to say, through gestures, movements, pictures, and/or words. This book shows how American Sign Language utilizes all of these natural skills. It uses helpful hints and picture clues to make the signs accessible to young children.

Our National Symbols, by Linda Carlson Johnson. Millbrook Press: Brookfield, CT, 1994.

(Recommended grades: 2-5)

Describes how national symbols evolved after the American Revolution. These include the flag, the Pledge of Allegiance, the Liberty Bell, the eagle, Uncle Sam, and the Statue of Liberty.

Out of Darkness: The Story of Louis Braille, by Russell Freedman. Houghton Mifflin: Boston, 1999.

(Recommended grades: 4-8)

Braille was a nineteenth-century Frenchman. Blinded at the age of three, he went on to develop a system of raised dots that enable visually impaired people to read and write.

Pass It On!: All About Notes from Secret Codes and Special Inks to Fancy Folds and Dead Man's Drops, by Sharon Bailly. Millbrook Press: Brookfield, CT, 1995. (Recommended grades: 3-6)

This book explores the history of writing. It offers instructions for making special inks, using various alphabets and codes, and creating personal seals and private letter drops.

A Picture Book of Louis Braille, by David A. Adler. Holiday House, Inc.: New York, 1998.

(Recommended grades: K-3)

This picture biography presents the life of the nineteenth-century Frenchman, accidentally blinded as a child, who invented the raised-dot code now used around the world by the visually impaired.

Red, Yellow, Green: What Do Signs Mean? Scholastic, Inc.: New York, 1998.

(Recommended grade: PreK-3)

A sticker activity book that teaches children about common signs including STOP, DON'T WALK, DETOUR, SCHOOL CROSSING, and many more. It uses clever rhymes to remind readers of the meaning of these signs.

The Rockslide Rescue (The Shoebox Kids, Bk. 8), by Sandra L. Zaugg. Pacific Press Publishing Association, 1998.

(Recommended grades: 2-6)

Willie, who uses a wheelchair, is caught in a landslide along with his grandfather. Some of the other Shoebox kids use Morse code to find them and bring them to safety. The book includes transcriptions of Morse code and instructions for making a "butter-tub" transmitter.

Samuel F.B. Morse, by Jean Lee Latham. Chelsea House: New York, 1991.

(Recommended grades: 2-6)

A brief biography of the inventor of the telegraph and Morse code.

The Secret Birthday Message, by Eric Carle. HarperCollins Children's Books: New York, 1986.

(Recommended grades: K-3)

On the night before his birthday, Tim finds a rebus note, a secret message directing him to his gift.

The Secret Code, by Dana Meachen Rau. Grolier Publishing: New York, 1998.

(Recommended grades: K-3)

Oscar, who is visually impaired, teaches Lucy how to read his Braille book. Intrigued by Oscar's "Secret Code," the other class members are eager to learn it too. Readers are also invited to learn Braille, and to use it to decipher a note from Oscar.

Secret Codes and Hidden Messages, by Jeffrey A. O'Hare, Boyds Mills Press, 1997

(Recommended grades: 3-6)

This little book is full of great codes. Along with Morse code, sign language, semaphore, and Braille, it also includes chart codes, ice cream codes, hidden picture codes, and musical codes.

The Sign Painter's Secret: The Story of a Revolutionary Girl, by Dorothy and Thomas Hoobler. Silver Burdett Press: Englewood Cliffs, NJ, 1994. (Recommended grades: 4-6)

When British troops occupy her house during the Revolutionary war, young Annie MacDougal must find a way to help General Washington's troops by keeping the sign painter's secret.

Signs, Symbols, and Codes

Signs and Symbols Around the World, by Elizabeth S. Helfman. Lothrop, Lee & Shepard Co.: New York, 1967.

(Recommended grades: 5-8)

Describes graphic signs and symbols and their importance in communication through history. Examples includes picture writing by cavemen, numbers, musical notes, religious signs, trademarks, signs in science and industry, trail markers, and traffic signals.

Taking a Walk/Caminando, by Rebecca Emberley. Little, Brown & Company: Boston, 1991.

(Recommended grades: K-3)

Labeled illustrations and Spanish and English text introduce signs, symbols, and other things a child sees while on a walk.

Tomorrow's Alphabet, by George Shannon. Greenwillow Books: New York, 1996.

(Recommended grades: PreK-3)

For children already familiar with the sounds of the alphabet, this is a lively book about creative design. Why does "A" stand for seed? Because this seed is tomorrow's Apple.

26 Letters and 99 Cents, by Tana Hoban. William Morrow & Co.: New York, 1995.

(Recommended grades: PreK-3)

This innovative book is really two books in one—an alphabet book and a counting book. On the alphabet side, each upper and lower case letter is matched to a photo of an object. Turn the book around and the numbers are illustrated in sequential order from 1 to 30, by 5's to 50, and by 10's to 90.

Uncle Sam and Old Glory: The Symbols of America, by Delno C. West and Jean M. West. Simon & Schuster Children's Books: New York, 1999. (Recommended grades: 3-6)

This book shows how the American buffalo, the Statue of Liberty, the Mayflower and Uncle Sam have all been used to symbolize the United States and its political system.

You Don't Need Words! A Book About Ways People Talk Without Words, by Ruth Belov Gross. Scholastic, Inc.: New York, 1991. (Recommended grades: 2-5)

Describes sign language and other ways that people communicate without words. Among the topics discussed are Native American picture writing, hobo signs, international signage, code flags, body language, and hand signs.

Assessment

Nearly everyone agrees about the importance of assessment, but what exactly is it, and why is it so significant in education? In a very broad sense, education is like a very large design problem and assessment is the method of evaluating the design. However, education has many objectives, not just one, so assessment also includes a complex process of deciding what to assess and how. Another major complication is that many different kinds of people have a stake in the outcome of the educational process. Parents want to know how much their children are learning and how they can best help them. Politicians worry about the backlash from voters if the educational system appears to be “failing,” however that term is defined. Administrators fear that they will be held accountable for low test scores in their schools.

Teachers, who have the most sustained and direct involvement of any adults in the educational process, are constantly looking for ways of knowing how well and how much their students are learning. This data can come from both formal and informal assessment methods, and may be either qualitative or quantitative. At the same time, teachers are often held accountable to conflicting requirements that are difficult or impossible to meet. For example, the goal of providing a supportive and welcoming learning

environment may be in conflict with the regimentation imposed by administrative requirements. Another common concern of teachers is that high-stakes testing will require them to “teach to the test” rather than to support student learning.

Regardless of demands from outside the classroom, a teacher’s primary responsibility is to engage students in exploring and understanding the subject matter. Assessment includes any method of finding out how much of this exploring and understanding actually happens. Information gained through assessment is the only factual basis for knowing what students are learning, how to motivate learning more effectively, how and whether to redesign the curriculum, how to tailor it to the needs of individual students, and how and when to involve parents in the process. Assessment is far too extensive and important to be narrowly defined by standardized test results or to be determined by people outside the classroom.

Here are some basic conclusions that follow from this view of assessment:

- Assessment should be based on clear educational goals.
- Many different kinds of information should be collected as part of assessment. Some of the most important assessment data is totally unexpected.

- Assessment should not be divorced from curriculum; every learning activity should also provide information for assessment.
- Whenever possible, students should become involved in assessing their own learning—for example, by evaluating their own designs or predictions.
- Assessment should examine not only what students have learned, but also the opportunities provided by the curriculum and the learning environment.

We will illustrate each of these points using examples from the teacher stories in Chapter 4.

Educational Goals

To assess students’ accomplishments, it is important to begin with clear-cut goals, against which the outcomes can be measured. Often, new goals will present themselves as a unit unfolds, and these should be included too. In the example cited below, Mary Flores began with a simple goal—to move her second grade special education students towards literacy, and was able to pursue this one goal consistently throughout the project.

Mary had a hunch that her non-reading second-graders had learned to interpret their environment by decoding graphic symbols. Because many of these children had serious behavior problems, Mary was reluctant to take them on a signs-and-symbols scavenger hunt in the school, but she decided to take the risk. If her intuition was correct, she felt, she could use the study of signs and symbols as a way of motivating them to read and write. Mary believed she could move her students seamlessly from the graphic symbols they already knew to the more intimidating realm of language literacy.

It turned out that Mary was right. Her students were already able to read many of the graphic symbols in their environment. Furthermore, they were aware that these symbols have word equivalents, and that both a word and a graphic symbol sometimes appear together on the same sign. As one child put it, “If you don’t know the words, the pictures will give you the answers.” Mary had succeeded in stimulating these non-readers to see reading as an outgrowth of interpreting graphic symbols.

Later, Mary also found several ways to make the transition from making graphic symbols to writing words and sentences. First, she engaged her students in creating signs and symbols for kindergarten students. To help the kindergartners learn to read too, these signs would have to have words as well as pictures. Another strategy was

to have her students create their own games. The game boards consisted mostly of symbols, but the instructions for playing the game would have to be written in sentences. In retrospect, Mary felt that some of these youngsters had made tremendous progress through these activities.

Information from a Variety of Sources

If educational goals are complex and multifaceted, so are the means of assessing to what extent these goals are met. The narrowest view of assessment, most popular in political circles, confines it to standardized tests. A somewhat broader view expands assessment to include all kinds of paper-and-pencil instruments designed specifically for assessment, such as worksheets, homework assignments, tests, and quizzes. Our view of assessment is broader still. In the course of an activity, nearly anything students do generates information that is valuable for assessment.

Felice Piggott’s work with “DANGER” signs illustrates how a complex set of educational goals requires equally complex assessment methods. Felice began her fourth grade signs-and-symbols unit after a difficult period of high-stakes testing, so a major goal was simply to engage them in something exciting and fun. Of course, she had educational goals as

well. She wanted them to reflect on signs and symbols in the environment, and to be aware of how they are used. In designing their own symbols, she hoped that they would think about alternative ways of representing a simple message.

Felice had another goal, which was considerably more of a challenge. She saw the unit as an excellent opportunity for her students to learn basic ideas about design. An essential ingredient of any design project is the evaluation of the design, and Felice wanted her students to come up with their own methods for testing their designs, including the collection and analysis of quantitative data.

In assessing this work, Felice looked at a wide variety of outcomes. She looked not only at the signs the students created, but more importantly, at the methods they designed to test these signs. Felice evaluated their plans for the tests, their follow-through in implementing what they had planned, and their recording and interpretation of the data. In their comments, students recognized that their objectives included both the design of signs, and also the design of evaluation methods. They also reflected on how well the groups had functioned. Clearly, Felice had conveyed a rich set of educational goals to her students.

Part of the attraction of teaching is that much of what happens in the classroom is unpredictable, and some of the surprises are pleasant and even

thrilling. Consequently, it is impossible to decide in advance what all of the methods of assessment will be. Often, serendipity provides ways of assessing students' learning that nobody could have anticipated.

Chapter 4 contains some striking examples of serendipity. When Theresa Luongo's student used a "NO U-TURN" sign to indicate "DON'T GO UNDER THE ARCH!" he was demonstrating his understanding of the power of a symbol to convey a message, even though it was not the same message intended by the sign maker. Mary Flores was impressed by the kindergarten student who said, "I don't understand the sign. I think you should redesign it." This child had obviously developed a comprehensive grasp of the design process. Along the same lines, one of Felice's students made a remarkable connection between the design process he had gone through and that of professional designers when he said, "I guess this is what the guy who invented the STOP sign went through."

Curriculum as a Source of Assessment Data

In order to maximize the amount of information available, the curriculum itself should be seen as a rich source of assessment data. Nearly all of the teachers whose stories appear in

Chapter 4 used a brainstorming activity or scavenger hunt to introduce their signs-and-symbols units. In either activity, students provide data about what they already know, while also beginning to explore a topic. For example, Guillermina Montano solicited her third graders' ideas about what the white circle in front of her classroom might mean. A few days later, she asked them for examples of how symbols and signals are used to guide children's behavior. Subsequently, they brainstormed areas in which children's behavior could be improved. Each of these sessions was both a learning activity, and an assessment opportunity for Guillermina.

Working with a sixth grade class with many behavior problems, Christine Smith found a variety of creative ways to assess her students' work in the context of her signs-and-symbols curriculum. In-class assessments took the form of brainstorming sessions and games, which required the students to figure out the meaning of "mystery" symbols. Christine invented the term "quiz/game" to suggest that these enjoyable events also served as assessments. After the students had designed their own signs to convey secret messages, Christine held each one up to the class and asked them to determine its meaning. In doing so, the students were developing their own ability to decode symbols and evaluating one another's signs. At the same time, they were also providing Christine with assessment data both about their decoding abilities, and also about the signs they had designed.

Students Assess Their Own Learning

Should the audience for assessment data include students themselves? Obviously, students need to know how well they are doing, so they can gauge their own efforts and develop realistic goals for their own learning. However, traditional assessment is usually presented to students in an adversarial manner, in the form of test grades and report cards that frequently undermine rather than enhance their motivation for learning. In traditional forms of assessment, students are always evaluated by adults rather than by themselves or each other, and the outcomes of assessment often have high stakes. These factors contribute to the view of assessment as an antagonistic process. How can students assess their own and one another's learning without all of the baggage of traditional assessment?

Signs and symbols offer natural opportunities for peer assessment. An obvious test of any symbol is whether the audience can figure out the message the symbol is supposed to convey. This sort of assessment is a feature of each of the design projects described in Chapter 4. Guillermina Montano's students posted signs by water fountains and stairways and asked other students what they thought they meant; Felice Piggott's students observed how others responded to their "DANGER" signs;

Mary Flores's second and fourth graders tried their signs out on kindergarten students; and Christine Smith conducted a quiz/game to test each group's signs with the whole class. In each case, the signs were being evaluated not by the teacher, but by other students. Often the outcomes of these peer assessments led to self-assessments such as this comment by one of Christine's students: "We should have used a different color."

In Angel Gonzalez's class, peer assessment took on an added dimension. His students were attempting to solve a problem of real significance to them: classroom interruptions caused by students asking to go to the bathroom, sharpen a pencil, etc. The solution would be to create a silent signaling system to convey messages to the teacher during class. The test of the system was to try it out in a classroom, and see if it really did reduce the number interruptions. Because the design project arose from a real problem, the designs could be evaluated by seeing how well they actually solved the problem. More than two years later, some of these hand signals are still in use in Angel's school!

Assessing Teaching, Curriculum, and Learning Environment

Like anybody else who designs or plans anything, most teachers engage in informal assessment of their work on an ongoing basis. They ask themselves, "Is it working?" This question is really one of self-assessment: "What is the quality of the learning opportunities I have provided for my students?" Some of this self-assessment by teachers is based on student learning outcomes of the kinds described above. At the same time, teachers also assess learning opportunities on the basis of their own perceptions and experiences.

Several examples of these self-assessments by teachers appear in the teachers' stories in Chapter 4. Felice Piggott, for example, felt that she should have introduced the concept of a fair test, and that the evaluation of the designs should have led to redesign activities. Christine Smith, in her reflections, suggested that next time she would require her students to collect quantitative evaluation data and would incorporate graphing as a way of representing the data. At the conclusion of his "Sell Your Brand" activity, Angel Gonzalez presented his class with a "Data Analysis Worksheet" that included such questions as, "What other information would be helpful in analyzing your data?" In retrospect, Angel felt that this and other some questions went well above the heads of his fifth graders.

The Institutional Context

Every school is different. Each one offers both resources that can be helpful in implementing a new curriculum, and barriers that can make it difficult. It is useful to analyze both carefully, with an eye to mobilizing and extending the resources and overcoming the barriers. In this section, we will look at how some teachers have gained crucial support from school staff, parents, other teachers, and administrators as they developed new programs in science and technology.

The Custodian

The custodian is a key person in the success of any project, particularly one that may take students outside of the classroom and into the rest of the building. The custodian is probably more familiar with the physical layout of the building than anyone else. He or she also has the best access to discarded materials, such as cardboard, waste paper, or wood, that can be very useful. A cooperative custodian can also offer suggestions about additional storage space, and can insure that projects in process will not be thrown out.

The custodian's involvement can also lead to exciting surprises, as the following story illustrates. A second-grade teacher and her class were studying

the water supply system of a school in the South Bronx, New York City. They began with the water fountain just outside their classroom. The children were convinced that the water for the fountain was stored in the wall just behind it. Then somebody noticed that there were pipes leading to the fountain.

They followed the pipes along the ceiling and realized that they came from someplace else in the building. At this point they went to another floor and noticed a similar pattern of pipes. Eventually, their investigation led them to the basement. There they met the custodian, who gave them copies of the blueprints (maps) of the building, and showed them how the water came into the building. The following day, he gave them an opportunity to turn on the boiler, so they could see how the hot water was heated! The outcome of this investigation was a working 3D model of the building's water supply in which the pipes were represented by straws and the reservoir by a basin held above the highest floor.

Parents

Parents can also be critical to the success of a curriculum project. A number of teachers have involved parents in investigations of the community around the school. One ESL teacher in East Harlem, New York City, whose students were recent immigrants from various parts of Latin America, engaged her students in a study of the *casitas* in the community. A *casita* (literally, "little house") is a small building constructed by community residents on a vacant lot, which may serve as a clubhouse or a religious shrine, or which may be used to house livestock. Several parents who were very familiar with the community accompanied the class on their field visits and facilitated their discussions with the users of the *casitas*.

How does a teacher get parents involved in the first place? Some teachers have organized parent/child workshops, after school or on Saturdays, as a way to inform parents of what their children are doing and to solicit their support. One strategy that has worked is to have a parent/child workshop a few weeks after children have begun a project. In the workshop, parents and their children are encouraged to pursue a hands-on project that is similar to what the

children have already been doing in school. Because the children have already started the project, they will often take the lead in explaining the material and offer their parents advice on how to proceed. At the same time, parents will provide their own experiences and expertise, and some may become excited enough to volunteer additional support. Parent volunteers can provide the additional adult presence needed for taking the class outside the building.

Other Teachers

Just as children often require peer interaction to pursue a project, so peer support can be essential for teachers too. Another teacher can be a springboard for ideas, a source of advice on overcoming difficulties, and a friend to turn to when everything seems to go wrong. There are many models for teacher/teacher collaboration, each of which can work in some circumstances. Ultimately, the collaborators have to figure out for themselves what works best for them. Here are some examples of ways in which teachers in the same school have worked together:

- An experienced teacher gave workshops in the school, in which she engaged other teachers in some of the same activities she had been doing in her classroom. Several of the other teachers became interested and sought advice on pursuing these activities in their own classrooms.
- An experienced special education teacher mentored a less experienced special education teacher, offering her assistance in some of the same projects she had done in her own classroom.
- A science cluster teacher met with a classroom group during a “prep” period twice a week. She enlisted the students’ classroom teacher in pursuing some of the same projects as part of their regular classroom work.
- A fifth grade teacher and a kindergarten teacher decided to work together. After the fifth-graders had pursued some of their own investigations, several of them became the facilitators in helping the kindergarten children do similar studies. The work involved cataloging and mapping what they found in nearby empty lots. Besides being a collaboration among teachers, this project was also a collaboration between older and younger children.

Collaboration among teachers may be actively discouraged by the culture of the school. Even in the best circumstances, collaborations can be difficult to sustain. Just as every school is different, so is every classroom. Ideas and strategies that work in one classroom may or may not be directly transferable to another, and it is important to remain sensitive to differences in chemistry and culture from one room to the next. The most important ingredient in a collaboration among teachers is the commitment to work and learn together, regardless of the outcome of any particular project or idea.

School Administration

A major component of a teacher's setting is the culture of the school administration. A principal, assistant principal, or other supervisor can make or break an innovative curriculum project. Some teachers are fortunate enough to find themselves in environments that nurture innovation; others are not so lucky. For better or worse, the tone set by the administration is a major factor that every teacher has to deal with. Even without initial support, however, there are a number of strategies for bringing a skeptical (or even a hostile) administrator on board.

One teacher, who was a participant in an in-service inquiry science program, had a roomful of upper-elementary students engaged in long-term science investigations, largely of their own design. She decided to encourage them to enter their projects in the school science fair. She immediately ran into the opposition of her principal, who insisted that all of the material on the display boards be "professionally done." The teacher knew that her students were invested in their projects, and perfectly capable of creating their own displays, but unable to type the material or produce fancy graphics. To make the displays for them would be to undermine all of their efforts and

enthusiasm. So she presented the situation to her children, without any suggestion about what they ought to do about it.

The next time the principal visited their classroom, the students let him know that they wanted to enter the science fair, and they believed they could make display boards which would be perfectly readable. In any case, they would be around to explain anything the judges didn't understand. With the teacher standing by silently, the principal reluctantly gave in. At the fair, it became clear that these were the students who had the best grasp of their own projects, although there were others that had nicer-looking boards. Neither the children nor the teacher were surprised when they won first, second, and third prizes, and went on to the District fair! Equally important, the teacher felt that this was a turning point in her relationship with the principal. Afterwards, he interfered much less with her efforts at innovation.

It is far more effective to mobilize children, parents, other teachers, and staff than to confront an administrator directly. He or she will have a much harder time saying no to children, parents, or a group of teachers than to an individual. Also, successful programs speak for themselves. Outside authorities, such as science fair judges, funding sources, or important visitors, can make even the most reluctant principal

sit up and take notice. Most important, innovation succeeds best when innovators lay the seeds quietly over time, and exploit opportunities to overcome resistance.

Resist the temptation to take on every adversary, every time. Focus instead on the resources that are available to you, and learn how to mobilize them effectively. Wait for opportunities to let your efforts speak for themselves.

