TEACHING SCIENCE *in the Multigrade Classroom*

By Melvin Campbell and VirLynn Burton

A concerned mother rushed up to Maria Carlton in the supermarket. Maria, a multigrade teacher, was busily examining a stack of oranges in the produce department.

"Ms. Carlton," the mother said determinedly, "I want to talk to you about my daughter!" As the teacher listened apprehensively, the mother continued, "Susan spends all her evenings working on science!"

Ms. Carlton sighed with relief. This was the kind of parental problem she liked to hear about!

Newspaper articles and research journals have documented the lack of interest in science by American youngsters, as well as their poor performance on standardized tests. But Ms. Carlton's students were enthralled with science. What kind of curriculum would cause the kind of "problem" she encountered in the supermarket?

Ms. Carlton's science program made it possible for all the students in her room to learn, regardless of their grade level or intellectual development. Many of her students even claimed that science was their favorite subject!

She did not have a science major in college. Her undergraduate teacher training had included one science methods course and the basic core requirements in science.

Ms. Carlton did not choose her career because she wanted to teach science. In fact, teaching elementary school science was near the bottom of her list of interests while in college.

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Anything but Science

When Ms. Carlton began teaching she was a "2 x 4" science teacher. (The "2 x

4" teacher is one who teaches material between the two covers of a textbook within the four walls of the classroom.) This was her elementary science program: have students read the textbook, sometimes in a round robin fashion, then assign the usual worksheets, and administer a written test.

Since the school provided no science equipment, Ms. Carlton assumed it was impossible to conduct laboratory experiments in the classroom. Collecting the needed supplies was just too much work! Besides, she had to admit that she would rather teach something else—reading, language arts, art, spelling, Bible—anything but science.

Boredom Strikes

As time went on, she began to reconsider. Perhaps it was because she was bored—and she suspected that her students were bored, too. Although she was not a scientist and did not have a keen interest in the subject, Ms. Carlton realized that her students deserved something better than she was giving them.

She began to develop a new science curriculum, for she knew that with four grades in her classroom, she needed to provide instruction at a variety of grade levels. She decided that she would incorporate the teaching methods she enjoyed using in her other classes. Her students would begin to study science just as they did language arts, social studies, and art.

In teaching other subjects Ms. Carlton involved her students at all levels in preparing written reports, group presentations, drama, writing and telling stories, drawing, and other projects. Transferring these methods to the science class produced almost magical results.

How to Begin

First, this innovative teacher selected the topics to be studied. From the science books for each grade, she listed the behavioral objectives for the grade levels. She wrote next to each objective the grade for which it was designed. This was not too difficult, since many of her science books included chapter objectives. Ms. Carlton added other objectives to personalize the curriculum to her classroom and the location of the school.

Next, she listed specific activities relating to the objectives. She used three categories: Art, Reports, and Creativity. The art activities included drawing pictures and labeling, doing photo essays, designing and building models, preparing bulletin boards, and making posters. Typically, this section included 8 to 12 possible projects, depending on the subject.

The Report section required students to collect newspaper articles; do surveys, outlines, and interviews; and write reports. This section listed 12 to 30 specific ideas related to each topic.

Ms. Carlton called the third section "Creativity." This category included projects such as experiments, letter writing, visiting and reporting, preparing maps, writing science fiction, collecting and labeling. The list for this category numbered 20 or more for each lesson.

Ms. Carlton compiled her list of specific science activities from personal interests, the textbooks, and resource books. Whenever possible, she used ideas from her students. She sought to include enough variety and quantity to appeal to every student.

Introducing the Unit

At the beginning of each unit, she introduced the topics to be studied. The students were assigned chapters to read in their textbooks.

After completing the reading, the students chose two items from each category of projects. Most of the work could be done in the classroom or the school library. However, some projects had to

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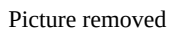

be completed outside of the classroom.

Hands-on projects made the textbook come alive for the students. They began to grasp the relationship between their classwork and real life.

This science program reversed the traditional roles of the teacher and student. She became the facilitator of science instruction, while the students participated actively in learning.

The structure of the new program capitalized on the strengths of the multigrade classroom. Peer and cross-age tutoring reinforced learning. Students of various grades and developmental levels worked together on science during the same class period. The variety of projects allowed students to utilize their best learning mode.

Each project included a deadline. One day each week was designated for students to describe their projects. During these "show and tell times" Ms. Carlton reinforced the objectives for each lesson.

Each student maintained a portfolio of his or her work. Grading for each project was based on neatness and content. Ms. Carlton evaluated projects periodically during the unit. This provided each

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student with necessary feedback.

Evaluation

After the project deadlines, the teacher scheduled a review session. Finally, the pupils had to successfully pass a paper-and-pencil test to obtain a minimum grade. A different test was given for each grade level. To receive an "A," the students were required to do three more projects—one from each category.

Upon completion of each unit, the students took their portfolios home. To keep parents informed, Ms. Carlton sent letters home with each unit of instruction.

Results

After implementing the new curriculum, Ms. Carlton found science teaching invigorating and enjoyable. Although the initial preparation did take some time, implementing the program required very little daily preparation

The students' response to Ms. Carlton's new curriculum was most encouraging. They began to pressure her to let them see the next outline of projects so they could begin working on them. They asked to have science periods extended, and begged her to schedule science class more often.

With this kind of response, Ms. Carlton doesn't even mind being stopped in the supermarket anymore! □

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THE UNPRINCIPALED TEACHER— BEING YOUR OWN ADMINISTRATOR

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When I left, it was a solid two-teacher school, and financially stable.

Yet this growth was hard on the board, the church, and the teachers. For several years everyone assumed that the growth was temporary. They fretted, "Will we have to cut back, or can we continue as a two-teacher school?" Looking back, I recognize that "committee skills" were needed to deal with this uncertainty.

Consult your local libraries for books on administration and decision making to help solve problems like these.

Getting Along With Boards and Committees

Classroom management is included in every teacher-education curriculum. Educational psychology classes teach about the requirements of children's psyches. But few teachers have studied about the care and feeding of board members' self-esteem.

Combining management skills with leadership skills can help small-schools teachers to function successfully in their many roles.

Here again, the skills that have made you an effective teacher will be useful.[10] Books on interpersonal skills are readily available. Read several, and try some of their suggestions. Better yet, why not ask the union education office if you can take some of your recertification courses in the area of educational administration?

Finance and Budgets

Who knows how many teacher's editions, workbooks, and paper towels it will take to run the school effectively next year? And which company's science supplies are the most teacher-friendly? Certainly not the school board. But on every school board there seems to be at least one member who thinks "cheapest is best." There is often not a good way to deal with this member. These and similar problems are not easily solved. Use your patience skills when faced with seemingly unsolvable problems.

Recognizing the Skills of Small-Schools Teachers

Small-schools teachers' competence has been demonstrated in the superior achievement-test scores of their students. Further, experience has shown that the small-school-trained teacher can readily transfer to a larger school, but rarely is the opposite true. Perhaps the unions or the North American Division could acknowledge these special skills of the small-school teacher with an endorsement added to the regular certification.

Technical Competencies

Leadership requires at least 10 technical competencies: (1) living with unfinished business, (2) taking nothing for granted, (3) coping with unexceptional resources, (4) facing up to adverse circumstances, (5) bearing the anger and hostility of others, (6) taking criticism, (7) accepting the contribution of others, (8) working ahead of time, (9) renewing one's energy and application, and (10) taking risks.

This is a wonderful list of qualifications, the possession of which would make for terrific human beings as well as good teachers! Add to this list interpersonal and decisional leadership, and it provides a good description of the qualities needed by the small-school teacher. Many of these teachers already possess the bulk of these skills. If you feel deficient in some of these areas, some of the suggestions in this article should prove helpful.

Summary

The introduction of appropriate methods and curriculum guides have dramatically reduced the stress level of the small-school teacher. The most recent of these helps is perhaps the best of all—the *Small School Survival Guide.* Through this resource and other means the small-school teacher can obtain and develop the needed skills to deal with the challenge of administration.

The small school is alive, well, and academically sound. With a nod to Mark Twain we can say that "The reports of its death are grossly exaggerated." The