



MELANIE EVANS leads Mary Dawson's class in "The Meeting Place," where students develop math skills working with the calendar, a clock and counting charts.



A POLYGON? Amy Watkins' first graders can not only explain what one is, but eagerly prove they can create them, given a ruler and a piece of chalk.

## Union Teachers Sold On 'Saxon' Approach To Learning Math

BY SUSAN USHER

Remember grade school math? Chances are you learned math by one of two approaches:

A: The traditional textbook approach, in which a new math skill is introduced in every chapter, in isolation. Students typically never see the material again once the class moves on. Either you "get" it or you don't.

B: The applications approach, in which students grapple with a problem, and are then introduced to concepts that help solve it.

But what about C? Union Elementary School teachers believe they have found a way to teach math that makes more sense than A or B above, a method that works for more students. It doesn't skip from topic to topic, doesn't change language in mid-stream, doesn't use application or frustration as a starting point for learning.

It does build on what students have already learned and provides plenty of opportunity for mastery and recall. It emphasizes skills first, then abstract theory.

The approach is called incremental development, in which a concept introduced at one point keeps reappearing, and being practiced, throughout the year.

Advocates call it "Saxon" math after its renegade publisher, former U.S. Army officer and junior college algebra instructor John Saxon of Norman, Okla.

This year kindergarten and first grade students at Union use Saxon; next year third grade will too. Union's performance-based accountability plan requests a waiver to use state textbook funds to buy the materials. The waiver is needed because Saxon isn't on the state list of approved math resources, even though the approach is getting good reviews from far flung teachers who use it.

Veteran Union first-grade teacher Amy Watkins read about Saxon's approach to math in a professional magazine, then followed up. "We were so upset with the math we were using," she recalled. "I sent for a sample of the materials and a list of teachers using it in North Carolina."

She got on the telephone and came away convinced Saxon should be tried. After eight months of use, she's more certain than ever.

"In 18 years of teaching I've never seen anything like it," she says. "I'm impressed."

What's got her and other teachers so enthused that teachers from other county schools are coming to Union to see what's going on? A complete turnaround from the fragmented approach found in most texts; a consistent scholar's vocabulary; a fresh way of looking at math conceptually; practical applications that rely on everyday situations such as counting money, telling time, forecasting the weather and making a calendar; and a heavy emphasis on reading skills, use of manipulatives such as blocks and rulers, and practical applications.

Teachers don't need special training to use the Saxon approach. The packet comes with detailed instructions on everything from how to set up the classroom to scripted lessons. Watkins follows the scripts carefully when introducing new material; she wants to make sure nothing important is skipped.

With 130 lessons provided for a 180-day school year, the program provides plenty of time for teachers

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—Amy Watkins

to incorporate lessons on topics of their own choosing, like calculators, the one subject on the state first-grade math curriculum not covered by Saxon.

Using Saxon, kindergarten students work frequently with cubes and pattern blocks, two types of "manipulatives." Lessons are attuned to a young child's short attention span, short, moving quickly from one activity to another.

At all grade levels, new material is introduced in bits and pieces, integrated into what students are already doing. Work sheets include problems based on new information and previous lessons.

Basic math concepts and vocabulary once considered out of first graders' range are common. During a recent visit to Watkins' class, students eagerly drew examples of polygons on the board, carefully laying off each line segment with a ruler.

Corey FormyDuval has also used his ruler to measure the height of his bean plants. The first time he measured, one plant was three inches tall, the other six inches tall. When he measured again, the tallest was nine inches. He was impressed.

Before writing their name at the top of a paper, students first draw a line segment. But they don't just draw a line, they draw a line of a specific length—4 inches, 2 inches, 8 centimeters—with endpoints. And learn to adjust their signature to fit.

As part of their classwork during one recent visit, Watkins' students were writing math sentences for problems. To illustrate  $6 + 4 = 10$ , Heidi Bas wrote, "There were 6 pigs in a pen, 4 more came in."

Clock skills build on students' understanding of fractions, using terms such as "half past 10".

The approach appears to encourage students to reason, to begin seeing relationships, asking questions and drawing conclusions.

"Because of this math some of my kids have thought about multiplication who wouldn't have otherwise," Watkins said. "They begin to see it when we work with  $2 + 2 + 2 = 6$  and you ask 'How many times 2 is 6? Three times 2 is 6.'"

Watkins asks a special question every day that requires students to

draw on their growing logic and critical thinking skills. One recent example: How could you divide a pack of 8 sticks of gum with four friends (plus yourself, of course)?

"We couldn't ask those kinds of questions before because our students couldn't think that way," interjects Reading Recovery teacher Nancy Wemyss, who formerly taught a self-contained class.

"We have always done the calendar every day," said Phelps, who has taught kindergarten students 7% of her nine years in education. "The one thing we have noticed is that now that we have added counting by 10's and the clock, they are picking up skills like telling time. You don't have to teach a specific lesson; they just pick up on it naturally."

"I've always used a lot of hands-on activities, but this program ties it all together."

Like Watkins, she's impressed with the incremental learning built into every activity. When working with the calendar kindergarten students are first expected to create ABAB (like red/blue/red/blue) or ABCABC (red/blue/green) sequences with their pattern blocks, she said, and "now they're being asked to do A/B/B/C patterns."

Calendar time is also a standard in first grade, part of "The Meeting Place." With the Saxon approach the period is used to subtly work on a larger range of skills than in the past.

This day it is Ryan Bennett's turn to "teach" in Watkins' class. He guides classmates through a routine that includes reviewing the date, day of the year, month, season, time of day, day in the school term and the remaining days of school.

In a rap beat they chant aloud, "It's fun, it's fun. I can count by 10 and I'll start with 1, 10, 20, 30 ..."

On "The Meeting Place" board students track the weather for each day of the week, creating a graph. Studying the graph, the Student of the Day gets to predict the next day's weather.

In Mary Dawson's class, a shy Melanie Evans takes classmates through a similar routine. Today's shape is a trapezoid, she notes, before leading the class in counting by 5's to 150.

It's the 154th day of the school year (only 26 days until summer vacation, the kids point out). Translated into money, Drew Winters calculated, that would make \$1.54. He begins pulling out real money—a dollar bill plus two quarters and four pennies or five dimes and four pennies.

The class has only recently begun working with quarters, but hasn't forgotten dimes. "When we count



DREW WINTERS converts the day in the school year (No. 154) into cash, using real money.

with dimes, we count by 10's," Dawson reminds the class.

Teachers haven't had any problem adapting use of the Saxon-made materials to their own approach to lesson planning or instruction. During a recent thematic unit built around plants, instead of comparing blocks, kindergartners compared carrots as they explored the concepts of "longer" and "shorter," said Phelps.

"In kindergarten we've always come up with our own things and we do grade-level planning," said Phelps. The teachers find that Saxon covers more skills than the state curriculum for kindergarten and fits in well with what they are trying to teach.

According to one Teacher Magazine article, some of the educators who object to Saxon view him as a

"drill-and-practice fanatic" whose approach conflicts with the Standards of the National Council of Teachers of Math—the basis for most current movements of math reform.

Saxon's reply to people who question the need for practice: "Ask your favorite athletic coach for his opinion on the necessity of practicing fundamental skills."

Supporters of Saxon's use of "gentle repetition" and frequent, cumulative assessment say they don't see major differences in Saxon's and the Council's objectives. They believe differences between the two are more a conflict of personalities and egos. What they object to is the fragmented way traditional textbook publishers treat math.

They cite years of research that

indicate properly spaced review and repetition may not only increase the quantity of what is learned, but also the quality. Learners are more likely to recall conceptual principles. With frequent testing of all material—not just that covered since the last test—researchers have noted higher levels of achievement.

At Union, both first-grade and kindergarten teachers have seen encouraging results using the material with students of varying ability and don't see any basis for the criticism of Saxon's approach coming from some math reformers. They've seen entire classrooms of children brought farther along in math than when other approaches were used.

Several special services preschoolers placed in mainstream Union kindergarten classes are doing the work with success, and first graders who have been referred to special services during the year have tested higher than usual on their math assessments.

The "gentle repetition" approach gives students who didn't quite grasp a concept when it was introduced more than one chance for mastery.

"There is lots of built-in repetition and reinforcement, but not drill-work; it's scattered. It's not boring," said Wanda Phelps, kindergarten chairperson. "They may not get it at first, but they will because the work sheets provide more chances for them and review for the kids who got it the first time."

"There are some children who might not be getting it all, but they are thinking higher than they would have been," said Watkins.

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