DESIGNING STANDARDS-BASED CLASSROOMS

For many teachers, shifting to standards-based teaching is a bit like learning to eat calamari. Someone else orders it off the menu, then everyone gives it a try. The adventurous eaters may relish it immediately, while others need to taste it a few more times before willingly ordering it themselves. A few never acquire the taste.

The menus for standards-based teaching in the Clark middle schools list some common ingredients. Teachers in all of the districts found standards developed by national subject-area groups to be useful. Standards from the National Council of Teachers of Mathematics and the American Association for the Advancement of Science, highly respected professional organizations, helped teachers and others develop perspectives for their own content standards, and, thus, discouraged repetition of the content from one grade to another. In history, the initial standards proposed by several groups were

pilloried by politicians, but the modified ones have influenced state and local standards because teachers found their emphasis on "big ideas," not just facts, to be logical. Geography, which had almost disappeared from the curriculum, came back through standards supported by the National Geographic Society. Geography is now taught in a fairly uniform way across the six districts. Language arts standards, however, depend to a large extent on local and state values and priorities, although all exceed traditional curriculums in their emphasis on reading and writing skills.

In all the Clark districts, a handful of teachers participated in framing the standards. Then, in most districts, drafts circulated to all teachers within a discipline for a round of feedback. The process was open, but, as is usually the case for the development of new ideas in a district, most teachers did not become heavily involved. Thus, when standards-based reforms actually shoved off, few teachers had fully thought through the impact of standards on their instruction—or on their students' learning.

To "go to scale" with standards, that is, to implement them district-wide, districts needed to entice teachers into basing their instruction on standards, not treating them as an add-on. This is like driving a taxi in New York City after learning to drive on a country road. Instead of embellishing suggested lessons from the teachers' guides to textbooks or drawing from routines established early in their careers, teachers now needed to start their instructional planning with standards. Those most adept at it set learning outcomes, develop the rubrics (how student work will be judged), and frame performance tasks and assessments related to the content. Standards-based teaching has taken hold best in places where content standards are augmented with three major types of support:

- performance standards that tell teachers and students how good is good enough when attempting to meet the content standards;
- articulate, sane assessment policies; and
- assistance for teachers in analyzing their teaching, preparing lessons and assessments, and developing on-site and local networks of expertise.

Content standards, general statements about what students should know, are often too vague to launch changes in teaching practice. Performance standards are needed to make content standards real for teachers. They define a student's level of mastery of

content standards. If content is composed of many grains of knowledge, then performance standards are the cement for that knowledge. Performance standards can be in words, such as "proficient" or "advanced" levels of mastery, as in the Kentucky model. They can be defined as numbers, as in the scale from one to five that is often used in portfolio assessments. In Corpus Christi, the performance standards are written more as common objectives. Whatever the format, performance standards tell teachers concretely what to expect of their students. Then, by discussing and comparing student work, teachers can decide together what is below average, good, or excellent. In this way, examining student work moves to the center of standards-based instruction.

The next step is for teachers to design performance assessments around standards-based lessons. This process requires that teachers (and ideally students) create rubrics (also known as scoring guides) for each level of performance. With rubrics in hand, students are able to know beforehand what is expected of them—if you want the top proficiency level, then you must do these specific things well, say the rubrics. Expectations for learning are no longer a mystery to students, teachers say. And, rubrics function as a valuable check on teachers' efforts as well.

Few urban schools have ready-made expertise within their ranks to design and carry out such standards-based teaching. Most rely on outside consultants, especially at the beginning, to provide the core training. Yet several Clark districts are explicitly building up expertise by selecting outstanding teachers to serve as resources, such as the Clark Fellows in Louisville and curriculum leaders in Long Beach. Other strategies attempt to support department chairs as leaders on standards-based teaching and principals as instructional experts.

A measure of commitment to standards-based reforms is how deeply they permeate the work of schools. Some principals in the Clark schools in Corpus Christi and San Diego, for example, tell teachers that they expect to see standards-based lessons when they conduct evaluations. In Minneapolis, teachers submit improvement plans that must relate to the standards-based plans of the school and of the district. District-wide assessment programs in San Diego and Long Beach engage teachers in scoring portfolios, guiding them to consensus about the rubrics they will use. Teacher networks in Louisville promote intensive discussion about standards pertaining to particular subject matter. Common scoring guides encourage teachers throughout the Long Beach and Corpus Christi systems to hold all students to the same standards.

Nothing describes this transformation in teaching as well as teachers' work—the

lessons and assessments they create. Understandably, most teachers struggle to make the changes. In some districts, models of performance assessments linked to specific standards are distributed to teachers to accelerate their learning process. Teachers often begin by checking their completed unit plans to see how well they cover the standards. Gradually, most teachers realize that the tried-and-true lessons they used in the past may address the standards somewhat but fall short in many ways. In other words, you can't keep adding new cuffs to a sweater that has outlived its usefulness. Teachers report that they face the distasteful task of giving up or completely revamping favorite units because they do not relate to standards. Eventually, more teachers begin their planning for units—and the whole year—with standards; they design their units based on standards rather than consigning standards to an afterthought.

STANDARDS-BASED LESSONS IN ACTION

What does a standards-based lesson look like? Each of the following examples includes a standard, a teacher's lesson plan, student activities or work, and the teacher's reflections on the lesson. By analyzing actual student work, teachers are able to pinpoint effective and ineffective elements in the lesson and improve their own instruction.

EXAMPLE 1

From the district's science standards, Louisville, Kentucky

"Students understand scientific ways of thinking and working and use those methods to solve real-life problems."

"Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events."

LESSON PLAN

Janet Seibert, an eighth-grade science teacher at Louisville's Noe Middle School, addresses these standards in her unit on the physics of toys. The unit also addresses two science standards developed by the American Association for the Advancement of

Science. “The motion of an object can be described by its position, direction of motion, and speed.” And, “That motion can be measured and represented on a graph.” She divides the unit into three lessons:

Lesson One

The following concepts of physics are discussed with emphasis on the vocabulary of physics: Newton’s First Law, Newton’s Third Law, momentum, gravity, friction, force, centripetal, centrifugal, motion, and acceleration. The students will make a preliminary list of definitions for these vocabulary words and laws. The procedures for designing and conducting an experiment are reviewed (choosing the investigation question, independent variable, dependent variable, and control; hypothesis; procedure; materials list; conducting the experiment; keeping of records in a log; graphing the results; analyzing the results; and conclusions).

Assessment: The students will verify their vocabulary definitions when they do their own investigation and listen to other students’ presentations. A vocabulary quiz will be given at the end of the unit.

Lesson Two

A group of toys are placed on each table, as well as the vocabulary list from the preceding day. The students play with the toys, finding ways to demonstrate the vocabulary. They are then given a “Design an Experiment” worksheet to guide them in designing an experiment to test one aspect of physics listed on the paper, using the toys at their table as materials for the experiment. They conduct the experiment, keep a log of their results, and produce a graphic representation of those results.

Assessment: Students will hand in their design worksheet, log, and graphic representation. A scoring guide known to students at the beginning of the unit tells what is required for level 1 to level 4.

Lesson Three

Student groups will present their experiment to the class. Each group's experimental design will be discussed by the whole class, which comments on correct design aspects and recommends how the design could be improved.

Assessment: The presentation should include all aspects of the design worksheet, a demonstration of the experiment, and an explanation of their graph. Another scoring guide tells students what they need to do for each performance level.

For the final assessment, Seibert places a basket containing a group of assorted balls at each table. She asks students to choose a question they would like to investigate—a test of material, size, density, or "bounce-ability." Selecting one of the balls, each student designs and conducts his or her own experiment using a worksheet to organize the design and a log to record results. The students type up their work in the form of a lab report that can be used as a portfolio entry.

SEIBERT COMMENTS

"The science standards integrate some content of what were formerly very independent fields. Certain concepts of physics, for example, are now introduced much earlier in the high-school curriculum. As eighth graders, my students need to enter high school with some familiarity of the laws of physics. This lesson does that in an engaging way, and I find that students of all skill levels are able to learn something from it. Many students who are not verbally advanced understand the laws of physics in practical ways, even though they may not know they are physics-wise. I feel that for most students of middle-school age, the first battle we have is engaging the student in learning. This lesson does that for students of all levels. It also allows all students to succeed. Once a student is interested and finds success, she or he is open to further challenges."

EXAMPLE 2

From the district's math standards, Long Beach, California

"**Functions and Patterns**—Students will recognize, describe, and generalize patterns and build mathematical models to predict the behavior of real world phenomena which exhibit the observed pattern; **Numbers**—Students will generate, read, and use multiple representations of the same quantity; **Probability/Statistics**—Students will understand how information is processed and translated into usable knowledge in order to make decisions."

Math teachers at the middle-school level are great fans of using M & M candies in their projects. Sales reports from the candy manufacturer must show a huge bulge in consumption for this pre-teen age group considering how many are engrossed in deciding on the frequency of certain colors. Pam Whisner, sixth-grade science and math teacher at Stephens Middle School in Long Beach goes beyond studying simple frequencies, using the lesson to fulfill standards on numbers, statistics, graphing, and geometry.

LESSON PLAN

Problem: Given 25 M & Ms, use different methods to compare the number of each color. How do your amounts compare to others in your group? Which color is the most prevalent? Least?

Materials needed: 25 M & Ms, graph paper, colored pencils, protractor, calculator, pencil, ruler, lined notebook paper, white typing paper, colored construction paper, glue stick, and compass.

Directions: Separate the M & Ms by color. Record the colors in a frequency table. Use the information in the frequency table to create a bar graph. Be sure to label the axes correctly.

Take the information in the frequency table and make a table with the following headings: Color of M & M, Fraction, Decimal, Percent, and Degrees in a Circle. Under the last column, write total. Add the numbers

in each column to find the total. Use lined paper or graph paper. Remember, the total in the fraction column should be 25/25; the decimal total is 1.00; the percent total is 100%; and the degree total is 360.

Take the compass and draw a circle on white unlined paper. Use the protractor to make a circle graph showing the colors of M & Ms you received. Color each section of the circle appropriately. Label each section in the circle to show the percent.

Organize all of your work on a large sheet of construction paper. Be sure to follow the P.S.S. method: write the **problem** in your words; in the **strategy** section, put all of your tables and graphs; explain how and why you do what you do (the explanation is as important as the work) and in the **solution**, answer the problem using complete sentences.

RUBRIC:

6 POINTS: All parts of the assignment have been correctly completed. The work is shown, and the explanation is thorough and complete. There are no computation or conceptual errors.

5 POINTS: All parts of the assignment have been correctly completed. The work is shown. There is an adequate explanation. There are no computation or conceptual errors.

4 POINTS: All parts of the assignment have been completed. The work is shown and an explanation has been given. There may be some computation errors but no conceptual errors.

3 POINTS: All parts of the assignment have been attempted. There may be an explanation. There may be computation and conceptual errors.

2 POINTS: Some parts of the assignment have been attempted. There may be an explanation. There may be computation and conceptual errors.

1 POINT: There is evidence that an attempt at the assignment was made.

The students who receive a score of 3 or less will be asked to attempt to correct their mistakes.

WHISNER COMMENTS

"This is an assignment done as a review of content standards that have been taught throughout the year. The standard of number skills is met with the fractions, decimals, and percents. The standard on statistics is shown with the frequency table and bar graph. The standard on geometry is met with finding the degrees in each part of the circle graph. I think that the more the students integrate the standards the better they will understand them. I try not to teach in isolation and enjoy their discovery of relationships found in math.

"My students have fun while doing the project. They are always amazed at the math they know and how that knowledge can be stretched. The conclusions they are able to write always amaze me. This is not my original project, but I like to think that my version challenged my students to think beyond the norm for sixth grade. They feel proud and 'intelligent' when the project is finished.

"We have extended the activity by combining data from a group and creating a gallery of the results. The information is put on butcher paper, and a docent from each group explains the information shown. We also have combined all of the groups to make a class poster. This provides great information for comparing and ordering of decimals. It is a great way to review vocabulary."

EXAMPLE 3

From the district's language arts standards, San Diego, California

"The student responds to nonfiction, fiction, poetry, and drama using interpretive, critical and evaluative processes, including: identifies recurring themes across works; interprets the impact of authors' word choice, content, and literary elements; identifies the characteristics of literary genres; identifies the effects of point of view; analyzes the reasons for a character's actions, taking into account the situation and basic motivation of the character; makes inferences and draws conclusions about the events, characters, setting, and theme of fiction and nonfiction; identifies one-dimensional characters as opposed to fully developed characters; and identifies the effect of literary devices, such as figurative language, allusion, diction, dialogue, and description."

LESSON PLAN

Karen Lynn, a language arts teacher in grades seven and eight at Pershing Middle School, chose to respond to these standards by asking her students to compare a piece of literature with a presentation in another medium. Her students wrote a compare/contrast essay on the novel *Johnny Tremain*, about the Revolutionary War, and the Walt Disney movie based on the book. Her materials for students included:

- a written definition of compare and contrast;
- a format to guide the essay;
- an essay task list (read the directions, brainstorm your ideas); and
- rubrics for scores that ranged from level 1 to level 5.

LYNN COMMENTS

"In my classes, the percentage of below-grade-level readers is close to eighty percent. I intended this writing assignment to be a reading accomplishment entry for their portfolio. Upon reflection,

after reading the results of the students' work, I realized that I did not fashion the assignment or prepare my students enough to really have the opportunity to meet the standard completely. I decided to go ahead and grade the essays within the parameters I gave and not include it in their portfolios. It caused me to realize more and more how important it is to create the rubric first and then create the assignment requirements so that both are in sync.

"My mistake was in focusing only on the character and plot differences between the book and the film without also discussing theme, ideas, and points of view. In fairness to myself, even the limited focus we did use was very difficult for many of my students, most of whom still struggle with the idea of a five-paragraph essay of any kind. Of those who submitted a final draft of the essay, most were able to compare and contrast at least three to five different points. I plan to rework the assignment to include more guidance on the body paragraphs (and more preliminary discussion and note-taking on theme, ideas, etc.). I also will rework the grading rubric to a more specific inclusion of only those bullets addressed by the assignment, including a check-off list of points to be addressed in the essay."

STANDARDS CASE STUDY

A CLASSROOM WHERE STANDARDS DEFINE CLEAR GOALS FOR LEARNING

PAM WHISNER
Sixth-grade Math/Science Teacher and Standards Development Teacher Leader
STEPHENS MIDDLE SCHOOL
Long Beach, California

Go out the back door of Stephens Middle School, past the portable classroom where the school's steel band is practicing and across a section of the black-topped playground, through the doors of a regulation-beige, portable duplex, and you find yourself in a classroom steeped in standards-based teaching and learning. This is where Pam Whisner, sixth-grade math and science teacher, makes standards visible everywhere to her students and evident in everything they learn.

In most classrooms in the Clark network, posters of the district's standards or hand-written ones made by teachers are pinned to the walls. But Whisner's walls are different. They are covered with student work, and for each assignment graph, map, chart, or group research project a standard is written in bold print beside the student products. Below individual student drawings of snowmen and children on graph paper, for example, is a reminder: "Standard 1. Student will graph ordered pairs on the coordinate plane."

Whisner is a traditional teacher who fuses standards with what she has learned during more than 25 years in the classroom. Unlike some experienced teachers who don't intend to change what they believe works for them, this teacher is open to making her instruction fit better with the standards reforms in Long Beach. After teaching in the parochial system for 20 years, she switched to the public schools and a different challenge. "It took me a few weeks to realize how little English some of my students knew," she says. At Stephens, Whisner teaches three math/science block classes for the Learning

and Excellence Academy Plan (LEAP), which enrolls students who do well in classes and have good English skills but are not advanced enough to qualify for gifted and talented classes. She admits she has the advantage of having more motivated students than many of her colleagues.

Over the years, Whisner has learned that covering all the content in a textbook shortchanged her students. She began to develop more hands-on projects grounded in conceptual learning (during many visits to her classroom, textbooks were never used). The standards adopted in Long Beach expanded her ideas about teaching concepts, and she has become a teacher-leader on standards development, serving as department chair and on district committees that are writing performance assessments. Always looking for professional support, she participated in a two-year National Science Foundation program on teaching math, attends workshops, and searches for professional reading. She presents at workshops, too, and spent a summer aligning her instruction to standards, adding examples of performance standards. She shares her plans with other math teachers at the school, showing them how a whole year's work could become standards-based. She keeps track of the standards she has covered on a computer, developing performance assessments for every sub-set of standards.

Grouped at tables so they can easily work together, her students use tiles, geometry boards, and other hands-on tools known as manipulatives. When creating geometric patterns, however, they often cut the shapes out of paper. "Some students learn better that way," she explains. When teaching a concept, the calculators are put away, "but we use them when learning the 'why' of problems," she says. "Teachers need to realize that higher order thinking skills are as important as basic facts, and calculators can help with that." Her students do an open-ended "math problem of the week" that requires extensive writing. Her directions make them think beyond the mechanics: "State the problem in your own words; write it clearly; tell how you solved it; show your work; use

diagrams, tables, and graphs; answer the problem in a sentence; tell what you think of the problem—is it too hard, too easy, about right?"

In department meetings, Whisner helps her colleagues understand that one lesson can cover several standards, "that they don't have to get hung up on one area and drill it to death." She tries to convince them to leave behind what she considers elementary-level subjects, such as whole numbers, "but some teachers are adamant about teaching the basics."

Her students get the same message. "Mark off zeros instead of adding columns," she tells them. "Adding columns of zeros is elementary stuff." She explains the standards addressed by each lesson, reminding students that they are expected to show performance on each standard before moving on to seventh grade. She shows them shortcuts: "Build a rectangle around a polygon, then subtract the areas, which are triangles, to get the surface area of the polygon." She uses her training on multiple intelligences, or the individual learning strengths of students, to give students lots of ways to learn and show what they have learned. Soft music plays in the background while students do warm-up problems from an overhead. Sometimes she ends the class session by reading fiction that relates to science or math.

What distinguishes learning in Whisner's bungalow room from many traditional classes is that students find math both accessible and fun. To develop a frequency table, students choose a favorite item—ice cream, colors, movies, sports—and move around the room in a frenzy to ask 20 classmates for their opinions. She encourages students to use a variety of ways to present science projects for a "brief" unit on the solar system. She suggests: a talk show, a roulette game, or a quiz. Learning that most of her students had already studied the planets, she asked them to conduct research that stretched them beyond what they already knew. Confessing that this was one of her least-liked units when she was in school, she tells them, "I need you to teach me. You may think teachers know it all, but we are not specialists in everything. Find something I might not know."

Whisner is confident that her instruction is much more focused than it was before she adopted the district's standards as its base. And her students, she says, are much more aware that they have certain material and skills to master, "that school is not just random learning."