

# On Common Ground®

Strengthening Teaching through School-University Partnership

YALE-NEW HAVEN TEACHERS INSTITUTE®

SPECIAL EDITION

NUMBER 15, FALL 2015



JACOB LAWRENCE, DREAM SERIES #5: THE LIBRARY, 1967

## Supporting Teachers in High-Need Schools

By Peter Salovey

Whenever I talk to teachers, I find myself reminiscing about my own education in public schools, where I had many great teachers, two of whom were especially inspiring. I was later to discover, when reunited with classmates, how many of those teachers' students had been influenced by them to become elementary, secondary, and college teachers themselves.

As a university teacher, I very much regret the eagerness of educational pundits to turn teachers into scapegoats for

the poor performance of students in our public schools, especially our high-need public schools, at every level, K-12. These teachers, who have unbelievably difficult jobs in overcrowded classrooms, should be respected as heroes. The best way to help them live up to that image, in their own minds and in the mind of the public, is to improve their professional self-confidence by empowering them collegially and improving their command of the subject matter they teach. The Yale National Initiative, with its roots in the Yale-New Haven Teachers Institute, is the pioneering and still the most robust way

to partner universities with high-need public school districts to this end. Our own faculty participants as seminar leaders both in New Haven and in our national work are a "Who's Who" among our top professors, more than a hundred of whom have taught seminars; and as the work spreads, this is also true nationally.

As part of our "Who's Who," four Deans of Yale College and many of our most acclaimed professors have taught Institute and National Initiative seminars over the years. This is a model we don't just perform locally. The Institute successfully  
*(continued on back cover)*

# Knowledge to College: On Knowing the Subjects We Teach

By Paul H. Fry

The two key expressions in this issue's theme statement are "supporting teachers" and "high-need schools." To this end, one important form of support provided by the Teachers Institute model is the improvement of teachers' content knowledge, which in turn increases the knowledge of their students. We think our cover image, Jacob Lawrence's "The Library," reflects this entire chain of collaboration. In the interest of support, then, and with the ultimate purpose of supporting students by making them better, the Yale-New Haven Teachers Institute, the Yale National Initiative, and the Institutes in Philadelphia, Delaware, and soon Richmond support teachers in an atmosphere of non-threatening collegiality by increasing their knowledge and understanding of the subject matters that the Common Core State Standards require them to teach. Assisted by the collegial mentorship of seminar leaders at their partner universities, in the course of things teachers' increased knowledge of these subjects will improve their students' performance and make them more excited about learning.

*On Common Ground* has frequently featured images of bridges, for reasons that are not far to seek. Because Number 15 emphasizes support, as well as getting students to a better place, we thought it would be good to present a bridge that's a *support network*, and to that end we have chosen the image above, Edmund Greacen's 1916 "Brooklyn Bridge East

*Paul H. Fry is William Lamson Professor of English at Yale University.*

River." Here you see the whole bridge — the icon of Hart Crane, Joséph Stella, and many others — with its columns, Gothic buttress forms, cable stays, and suspension interacting. Greacen was a New Yorker whose parents lived on the current site of the Rockefeller Center, his father a shoemaker. That tells you a lot about small beginnings and grand outcomes, and who knows whether, watching the emergence of New York as a modern



EDMUND WILLIAM GREACEN, *BROOKLYN BRIDGE, EAST RIVER*, 1916

metropolis, Greacen might not have been reflecting on such things as he painted this picture.

After all, the picture is very uncharacteristic for a painter whose forte was genteel Impressionist subjects influenced by the French Masters. Here we have a very different subject. Manhattan across the river was just beginning to sprout skyscrapers, the first of which was the Flatiron Building of 1903, followed by others of modest height by today's standards (the Chrysler Building wasn't started until

1925), but causing enough concern about changing horizons to bring about the establishment of the island's first zoning laws in 1916, the year of Greacen's painting. You can see — but from the viewer's eye only as a dim horizon — the new skyscrapers in the upper right. The viewer's eye has a rather low point of vantage, perhaps a rooftop, in Brooklyn. The most prominent object in the foreground is a smokestack. All the tenement windows are dark, the rooms behind them not yet visited by electricity. We receive the powerful impression of teeming life hemmed in by all the signs of poverty that would haunt the building facades of Edward Hopper's much later urban paintings. The rather brightly colored broad posters on the upper walls of the waterfront buildings — precursors of billboards — bespeak a kind of promise alongside the bridge, as if to say, even here in Brooklyn prosperity is possible for the enterprising, but our neighbor the bridge will take you to a new horizon. As New York had begun to grow, the need for such a bridge was envisioned, and it had been taking people over the river since 1883.

Naturally the bridge took people in both directions, but for his focus Greacen has made the emphatic choice of one direction only: In contrast with the dark, sunken, imprisoning feeling of the foreground structures, the buildings on the Manhattan side — and not just the Midtown buildings at the upper right — glow with what seems an almost inward light. The sun lights the foreground too, but it lacks the power of transformation and truly illuminates only the advertisements. Seen from a region of infernal smoke, Manhattan is a shining  
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**Credits:** **Front Cover:** Jacob Lawrence. *Dream Series #5: The Library*. 1967. Tempera on board, 24" x 35 7/8". Courtesy of the Pennsylvania Academy of the Fine Arts, Philadelphia. Funds provided by the National Endowment for the Arts, the Collectors' Circle, the Henry D. Gilpin and John Lambert Funds, and the Pennsylvania Academy Women's Committee. © 2015 The Jacob and Gwendolyn Knight Lawrence Foundation, Seattle / Artists Rights Society (ARS), New York. **Page 2:** Edmund William Greacen. *Brooklyn Bridge, East River*. 1916. Oil on canvas, 37" x 37 1/2". Gift of Mr. and Mrs. René Faure, daughter of Edmond Greacen, AG.1972.2.1. Courtesy of the Cummer Museum of Art & Gardens, Jacksonville, Florida. **Page 10:** Jasper Johns. *0 Through 9*. 1961. Oil on canvas, 54" x 41 1/4". Tate Gallery. © Jasper Johns/Licensed by VAGA, New York, NY. Photo Credit: Tate, London / Art Resource, NY. **Page 13:** Gordon Parks. *Emerging Man, Harlem, New York*. 1952. Photograph by Gordon Parks. Courtesy of and copyright The Gordon Parks Foundation. **Page 16:** Harrison Begay. *Navajo Medicine Men Making a Sand Painting*. Casein tempera, 13 1/2" x 20 3/4". Courtesy of Faye Gorman, for the estate of Harrison Begay. Photo Credit: Adobe Gallery Santa Fe. **Page 18:** P. Goldsmith, E.L. Feorino, E.L. Palmer, and W.R. McManus. *Human immunodeficiency virus*. 1989. Scanning electron micrograph. Public Health Image Library (PHIL), courtesy of the CDC. **Page 19:** Richard Irving Bowman. *Floating Nuclei*. 1987. Color lithograph with hand-applied detail, 12" x 17". Collection of Kimberly Bowman. **Page 20:** Thomas Kelly. *The Fifteenth Amendment*. 1870. Lithograph with watercolor, 22" x 28". Courtesy of James R. Vivian. Photo Credit: Yale Photo and Design. **Page 21:** Shepard Fairey / obeygiant.com. *Afrocentric (Red)*. 2007. Screenprint, 18" x 24". © Obey Giant Art. **Page 23:** Anthony Bianchi. *Structure of DNA Double Helix*. 2015. Adapted from *Biomedical Engineering: Bridging Medicine and Technology* by W. Mark Saltzman, Cambridge University Press, 2009. **Page 25:** Edward Ruscha. *Standard Station, Amarillo, Texas*. 1963. Oil on canvas, 64 15/16" x 121 13/16". Hood Museum of Art, Dartmouth College, Hanover, New Hampshire; gift of James Meeker, Class of 1958, in memory of Lee English, Class of 1958, scholar, poet, athlete and friend to all. © Ed Ruscha, courtesy of the artist. **Page 27:** Jacob Lawrence. *The Migration of the Negro, Panel no. 58*. 1940-41. Tempera on gesso on composition board, 12" x 18". Gift of Mrs. David M. Levy, The Museum of Modern Art. Digital Image © The Museum of Modern Art / Licensed by SCALA / Art Resource, NY. © 2015 The Jacob and Gwendolyn Knight Lawrence Foundation, Seattle / Artists Rights Society (ARS), New York. **Page 28:** Jacob Lawrence. *The Migration Series, Panel no. 1: During World War I there was a great migration north by southern African Americans*. 1940-1941. Casein tempera on hardboard, 12" x 18". The Phillips Collection. Washington, D.C. © 2015 The Jacob and Gwendolyn Knight Lawrence Foundation, Seattle / Artists Rights Society (ARS), New York. **Page 31:** Winslow Homer. *Old Mill (The Morning Bell)*. 1871. Oil on canvas, 24" x 38 1/8". Photo Credit: Yale University Art Gallery. **Page 32:** Eyre Crowe. *Slaves Waiting for Sale: Richmond, Virginia*. 1852-53. 20 3/4 x 31 1/2 in. Heinz Family Collection. **Page 35:** John Steuart Curry. *The Social Benefits of Biochemical Research, Northwest Panel*. 1941-43. Oil and tempera on canvas, 9 ft. x 4 ft. x .07". Commissioned with support from The Brittingham Fund — The University of Wisconsin Trust. Photo Credit: Robin Davies. **Page 37:** Elizabeth Bishop. *Red Stove and Flowers from Exchanging Hats: Paintings* by Elizabeth Bishop. © 1996, 1997, 2011 by Alice Helen Methfessel. Reprinted by permission of Farrar, Straus and Giroux, LLC.

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# Extending the Common Ground: The Yale-New Haven Teachers Institute and the National Endowment for the Humanities

By William D. Adams

Since its founding on September 29, 1965, the National Endowment for the Humanities (NEH) has been deeply committed to supporting teachers and humanities education. Over these 50 years, the agency has made more than 4000 grants for seminars and institutes involving nearly 85,000 high school teachers and college faculty. Those teachers and faculty have in turn benefited millions of students with new and richer course content and new approaches to teaching humanities subjects. This investment in human capital is one of the most important contributions the NEH has made to our nation's schools and colleges and to the broader culture.

NEH's relationship with the Yale-New Haven Teachers Institute is nearly as old as the agency itself. The Institute made its first application to the NEH in 1977 — 38 years ago — and the relationship has continued to develop since that time, including an important NEH Challenge Grant of \$750,000 in 1991 that helped the Institute establish a permanent endowment. NEH and the Institute also share a commitment to the notion that good teaching can be nurtured through the close involvement of teachers with one another and with academic mentors from the college and university community in seminar settings devoted to humanities subjects.

But the Yale-New Haven Teachers Institute added several dimensions to this model. The first is the centrality of community-based partnership between colleges and universities and local schools and school districts. The second is a core commitment to enhancing the effectiveness of teachers in public schools that serve low-income and minority populations. And the third is a program that explicitly incorporates the development of specific teaching strategies and lesson plans linked to program content. At the end of each Institute, teachers are required to write a curriculum

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*William D. Adams is Chairman of the National Endowment for the Humanities.*

unit for use in their home schools. Subject matter, curriculum and pedagogy are thereby combined in mutually supportive and clarifying ways.

The success of the Institute model led in 2004 to the creation of the Yale National Initiative to strengthen teaching in public schools. "The Initiative is a long-term endeavor to influence public policy on teacher professional development, in part by establishing Teachers Institutes that will provide state and local policy-makers effective examples of the innovative Institute approach in their own communities."<sup>1</sup> More recently, and in concert with the Obama administration's efforts "to build sustainable collaborations in communities with strong K-12 and higher education partnerships,"<sup>2</sup> the Institute has further amplified its aspirations by committing "to increase by one-third the number of urban and rural school districts that send teachers from high-need schools to participate as Fellows in national programs of the Teachers Institute."<sup>3</sup>

The creation of the Yale National Initiative was an important step. Notwithstanding bright spots of progress in some parts of the country, urban schools and school districts, especially in low-income neighborhoods, continue to struggle. And so, under the circumstances, do their students. As measured by the National Assessment of Educational Progress examinations, low-income and minority students continue to lag majority populations in nearly every measure of educational attainment.<sup>4</sup>

Within this familiar context of unequal resources and attainment, there are several relatively newer challenges and pressures facing secondary school teachers and schools, especially in the humanities.

Across every region and all levels of primary and secondary education, humanities teaching and curricula have come under intense pressure. The reasons are by now familiar. City and state resource and budget pressures, combined with expanding testing regimes and our increasingly exclusive and shortsighted preoccupation with

science and technology as the keys to "work readiness," are pushing humanities subjects from the center to the margins of school curricula.

Further complicating these pressures is the rapidly growing presence of digital and Web-based technologies and teaching tools in the classroom. Writing in *The Atlantic* several months ago, Michael Godsey observed that resources radiating from the Internet threaten to transform the teacher's role from that of primary source of classroom content to facilitator or curator of content coming from the Web. This is the reality of the "flipped" classroom, where online resources not only constitute content but also forge direct, interactive relationships with students.<sup>5</sup>

How will professional development programs like those run by the Yale-New Haven Institute and supported by the NEH adapt to these pressures and realities? What are the policy ramifications of the marginalization of humanities curricula and the ascent of Web-based teaching technologies and products? Can the professional development model forged by the Yale-New Haven Teachers Institute and NEH cope with these new realities? Or must we supplement them with other forms of curricular intervention and support and new forms of teacher training and development?

These are important and still unresolved questions. But one thing seems certain in the months following disturbances in places like Baltimore, St. Louis, and New York: focused attention on low-income and minority schools and communities is more important than ever. The commitment of the Yale-New Haven Teachers Institute and the Yale National Initiative is exemplary in this regard, and urban universities around the country ought to take notice. Modeling this approach for other American communities, while providing leadership in addressing the new realities of our K-12 educational environment, is a great service to the education community across the country.

*(notes on page 33)*

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# The Promise of the Teachers Institute Approach

*Ellen Eliason Kisker*

The Yale-New Haven Teachers Institute, begun in 1978, has developed an approach to teacher professional development that embodies many best practices: extended duration, a focus on content and the pedagogy linked to the specific content, active learning strategies, and alignment with state and local standards and curriculum.<sup>1</sup> Teachers Institutes are implemented through partnerships between local school districts and institutions of higher education.

Each year, Teachers Institutes offer weekly seminars over several months, led by university or college faculty members, on topics developed by Teacher Representatives who canvass teachers to identify topics that will enhance their knowledge of what they teach. In the seminars, the faculty leaders present information and lead discussions on the seminar topic, and they guide teachers in conducting research and developing curriculum units they will use with their students in the coming school year. In each seminar, the seminar Coordinator (an experienced Fellow) assists the seminar leader and supports other Fellows in the seminar. During the seminar, teachers have opportunities to present their curriculum unit in progress and receive feedback from other teachers in their seminar.

Seminar leaders also deliver talks to acquaint all Fellows with their seminar and encourage them to disseminate units from it. The seminar leaders receive compensation and participants receive stipends in recognition of the time and effort they are investing in improving teaching and curriculum. Teachers also receive faculty privileges at the university or college.

## **How the Teachers Institute Approach is Expected to Support Teaching and Learning<sup>2</sup>**

Teacher and university faculty back-

*Ellen Eliason Kisker is Managing Partner of Twin Peaks Partners, LLC.*

well as the leadership of the seminar Coordinators, shape the implementation of Teachers Institute seminars. The immediate products of the seminars are the curriculum units created by participants and the professional recognition and faculty privileges at the university that participating teachers receive for a year after beginning the seminar.

The units are expected to lead to three strands of outcomes corresponding to teachers, students, and university faculty. For teachers, seminar participation is expected to result in greater teacher leadership and collegiality and in increased content and pedagogical knowledge, which in turn are expected to improve the quality of their instruction. For students, teachers' increased knowledge and improved instruction is expected to lead to greater engagement in learning.

Ultimately, these intermediate outcomes are expected to increase teacher retention and advancement and improve teachers' performance (as assessed in school district teacher evaluation systems), enhance student learning of curriculum unit topics, and enhance the contributions of university faculty to public education. All of these outcomes converge to support higher student achievement.

## **What Teachers Say About Their Teachers Institute Experience**

The Yale-New Haven Teachers Institute (YNHTI) has a long history of collecting data to inform its work, and these data now constitute a rich, longitudinal record of Institute processes and outcomes. Each year, at the end of their seminar, Fellows must complete a questionnaire that captures key information about their teaching background and their seminar experiences, asks them to rate various aspects of their seminar experience, and includes open-ended questions encouraging Fellows to describe their experiences and the outcomes they expect (and if they have participated before, the outcomes they experienced after past seminars).

The careful process of discerning teach-

ers' professional development needs and interests and encouraging participation in Teachers Institute seminars yields a diverse group of Fellows. During 1992 to 2014, 39% of Fellows taught students in grades 9 to 12, 31% taught students in grades 6 to 8, and 28% taught students in kindergarten to grade 5. Fellows had nearly 6 years of experience, on average, in their present position, an additional 3 years of teaching in New Haven, and another 3 years teaching elsewhere. Fellows included both relatively new teachers (31% had 3 or fewer years of teaching experience) and very experienced teachers (19% had 20 or more years of teaching experience).

Teachers who have participated in a YNHTI seminar are not precluded from participating in subsequent seminars, and every year at least half of Fellows are veteran Fellows who have participated at least once before. During the years from 1992 to 2014, two thirds (64%; 50%-79%)<sup>3</sup> of Fellows overall were repeat participants.

The teachers who participate in the YNHTI are strongly motivated by a desire to improve the curriculum they use, to increase their content knowledge, and to work with other teachers. Nearly all Fellows during 1992 to 2014 cited the opportunity to develop curriculum to motivate students (94%; 82-100%) and to meet their needs (90%; 73-100%) as an important incentive for participating in the YNHTI. Nearly as many (70%; 57%-85%) cited the possibility of increasing their control over the curriculum.

YNHTI Fellows also sought to improve their content knowledge. An important incentive for most Fellows to participate was the opportunity to increase their mastery of their subject (89%; 80-95%) and to exercise intellectual independence (89%; 79%-98%).

The opportunity for collegiality also drew many Fellows to the YNHTI. Approximately 85% (77%-97%) of

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Fellows cited the opportunity to work with Yale faculty, and 76% (63%-84%) cited the opportunity to work with teachers from other schools as an important incentive to participate. Nearly two-thirds (64%; 50%-78%) reported that the opportunity for interdisciplinary work was an important incentive to participate.

The effort to identify topics that address the needs and preferences of teachers who might participate and select appropriate seminar leaders appears to ensure a good match between seminar offerings and teacher needs. Every year from 1992 to 2014, nearly all Fellows reported that the program was useful to at least a moderate extent, and 74% (61%-94%) said it was useful to a great extent. Most Fellows (73%; 59%-83%) reported that they intended to participate again in the future.

YNHTI leaders (seminar leaders, seminar Coordinators, Teacher Representatives) played key roles. During 1992 to 2014, most Fellows (80%; 68%-94%) described their seminar leader as useful to a great extent. Most Fellows also described their seminar Coordinator as useful to a great extent in providing information about unit deadlines (86%; 66-97%) and unit writing (75%; 63%-91%), acting as a resource (72%; 53%-86%), and facilitating discussions (64%; 49%-83%). Finally, Fellows also reported that their Teacher Representative was very helpful in encouraging teachers to apply (79%; 71%-93%), assisting with applications (75%; 68%-94%), maintaining contact with prospective Fellows (72%; 59%-84%), canvassing teachers for seminar subjects (66%; 58%-78%), and promoting use of curriculum units (57%; 43%-77%).

My professor was amazing. He had a thorough knowledge of all aspects of the topics we were developing and we all had a wide range of topics. He was an excellent resource as well as a thoughtful guide throughout the process.

According to Fellows, it is through the process of developing curriculum units and the use of these units that many of the effects of YNHTI participation are expected to occur. Most Fellows were motivated to participate in the YNHTI by a desire to improve curriculum, and most recent Fellows (91%) reported that their curriculum unit fills a gap in the existing curriculum or extends it in an important way.

Several teachers noted that unlike the existing district curriculum, the curriculum units they created were designed to support differentiated instruction for students of varying levels and learning styles within their classrooms. The survey reveals that this may be widespread; most Fellows (85%; 72%-97%) reported that their unit was designed for average students, but high proportions of Fellows also reported that their unit was designed for advanced students (68%; 56%-78%) and the least advanced students (65%; 56%-76%). In their narrative comments, a few Fellows noted that knowing more about a topic and having access to more resources on the topic enables the teacher to draw on a much larger body of material to both support struggling students and challenge academically strong students.

In describing their curriculum units, more than one-third of recent Fellows mentioned using deeper learning strategies, such as asking students to conduct research, analyze data, write about conclusions, or do performance tasks tied to the Common Core.

It has led me to do a bunch of research on a very important topic which resulted in inquiry-based activities that will encourage students to do thoughtful research, predict outcomes, analyze data, draw conclusions and question validity. They will read scientific journal articles and develop basic skills such as reading for information. They will design and run experiments that they will need to write about in the form of a lab report. They will be required to write an accurate procedure

and draw conclusions backed by their data. Taking all of this and applying it to a topic that I hope will be interesting to them, will be a great motivation.

A number of teachers mentioned that in preparing their unit, they learned research skills that can be applied to other areas of their teaching, and they learned about available university and community resources that may be useful to their teaching.

The most direct effects of teachers' participation in the YNHTI on student learning are likely to result when teachers implement their curriculum unit with their students. Fellows who participated in the YNHTI between 1992 and 2014 reported at the end of their seminar that they planned to teach their new curriculum unit to an average of 73% (62%-86%) of the students they teach.

The potential effects on student learning of using the curriculum units created by Fellows may be magnified through repeated use of the units over time and by dissemination of the units by the YNHTI and especially through Fellows' sharing of their units with their colleagues. Some veteran Fellows noted that they continue to use all or parts of units they created in previous YNHTI seminars.

Through YNHTI activities, Fellows increased their knowledge of their subject and became more confident in their ability to teach it. The YNHTI supports teachers' acquisition of content knowledge by offering talks; through the reading lists, lectures, and guidance of seminar leaders; through the content expertise of other participating teachers; and by providing access to materials to which Fellows would not otherwise have had access. Throughout the years from 1992 to 2014, nearly all Fellows agreed, and more than half (55%; 42%-69%) agreed strongly, that by participating in the seminar, they had gained knowledge of their subject and confidence in their ability to teach it. In the survey, most Fellows (81%; 70%-91%) reported that the knowledge they gained was useful to a great extent.

The most important result of teaching YNHTI units is that, through participation in the seminars, I have greatly increased my confidence in teaching the various academic subjects. Therefore, my teaching flows in a way that increases student participation. I am able to answer their questions more fully, give assignments pertinent to the subject matter, and share my knowledge with colleagues.

Fellows expected collegiality and peer support during YNHTI seminars to continue through new professional relationships with other teachers in the district after the seminars ended. The majority of Fellows cited the opportunity to work with Yale faculty and teachers from other schools as an important incentive for participating, and most Fellows found this aspect of the YNHTI very useful. During 1992 to 2014, nearly all Fellows reported that contact with Yale faculty was useful to at least a moderate extent, and half (54%; 38%-74%) reported that it was useful to a great extent. Similarly, two thirds (68%; 50%-81%) reported that interaction with other Fellows was useful to a great extent. In their narrative comments, some recent Fellows highlighted the importance of connections or relationships they formed during the YNHTI seminar.

The teachers I have worked with in my cohort contributed their strategies and classroom experiences, which were not only helpful for my curriculum unit project, but in addition taught me ways to become a better teacher in my classroom.

Participation in the YNHTI appears to have encouraged some teachers to provide leadership. Some Fellows indicated in their narrative comments that work on their curriculum unit sparked their interest in contributing to curriculum development and support in their school. For others, Institute participation inspired them to create a community of practice or provide professional development to other teachers in their school. For some Fellows, their

curriculum unit was a platform for collaborating with other teachers in their building and establishing curriculum connections. Some Fellows indicated that the opportunities for leadership within the YNHTI have enhanced their ability to participate in interdisciplinary school committees.

Participation in YNHTI seminars may have fostered more general improvements in Fellows' teaching. The interactions Fellows had with their seminar leader and colleagues included discussions of teaching strategies and feedback on their teaching. The YNHTI also may have improved teaching indirectly by increasing Fellows' motivation and enthusiasm for teaching. More than one quarter of recent Fellows (28%; 20%-32%) mentioned coming away from their YNHTI seminar with renewed energy and excitement for teaching.

Fellows expected their curriculum units to enhance their students' engagement in learning. In their narrative responses, Fellows expressed strong expectations that their curriculum unit would engage their students in learning.

Each year that I have participated in the Institute, I have been able to create a unit that allows me to reach my students and teach them through exciting and engaging ways. I have had the opportunity to reuse my units and enjoy seeing the excitement as my class gets involved in the learning. Because of this genuine interest, the students remain motivated and, I feel, learn the content in a meaningful way.

The greater ability to differentiate instruction that some Fellows highlighted may have contributed to Fellows' higher expectations of their students' ability to learn the material in their curriculum unit. During 1992 to 2014, nearly half of Fellows (48%; 26%-67%) strongly agreed that as a result of their seminar, they had a higher expectation of their students' ability to learn about the seminar subject.

## The Promise of the Teachers Institute Approach Warrants Further Research

YNHTI Fellows' feedback at the end of their seminars provides key support for the Teachers Institute theory of change and sets the stage for further research and evaluation. A study of curriculum units and their use is under way to examine features of the curriculum units created by participating teachers and to document use of the curriculum units by Fellows and other teachers. Other studies under consideration include an observational study of teaching practices and student engagement during curriculum implementation and a study to document teacher retention. Ultimately, these descriptive analyses may lead to more rigorous analyses of the impact of the Teachers Institute approach on teaching and student learning.

### Notes

1. Yale National Initiative (2007). *The Teachers Institute Approach*. New Haven, CT: Yale-New Haven Teachers Institute, Yale University; Smith, Rogers (2009). *To Strengthen Teaching: An Evaluation of Teachers Institute Experiences*. Philadelphia: Rogers Smith; Archibald, Sarah, Coggshall, Jane G., Croft, Andrew, and Goe, Laura (2011). *High-Quality Professional Development for All Teachers: Effectively Allocating Resources*. National Comprehensive Center for Teacher Quality Research & Policy Brief.
2. Kisker, Ellen E. (2011). The Teachers Institute Theory of Change. *On Common Ground*, Number 14, pp. 4-7.
3. Here and throughout the article, the first percentage is the percentage of all Fellows who participated during 1992 to 2014. This is followed by the range of annual percentages during the same period. For example, 64% of all Fellows who participated from 1992 to 2014 were repeat participants. The annual percentage of Fellows who were repeat participants ranged from 50% to 79%.

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# Supporting Teachers in High-Need Schools in Philadelphia

By Alan J. Lee

The Teachers Institute of Philadelphia (TIP), which has now finished its tenth year of operation, is based on the Yale-New Haven Teachers Institute which was established in 1978. More than 300 teachers have attended one or more of 45 TIP seminars on academic topics since 2006.

The City of Philadelphia is experiencing a physical and cultural renaissance that is readily apparent to visitors and regional residents alike. With the glistening buildings, fashionable restaurants, and robust arts and cultural sector, it is easy for many people to overlook a stubbornly high poverty rate in the less successful parts of the city which is especially pronounced in the city's public education system. The low-income student population ranges from 35% to 100% in many schools, and the School District (SDP) is experiencing ongoing fiscal crisis. While hard working administrators and dedicated teachers have in recent years miraculously raised the graduation rate to about 70%, this progress has been threatened by insensitive budget decisions made in the political arena.

Chronic underfunding and fiscal crises have led to school closures; layoffs of key personnel such as teachers, counselors, and nurses; large class sizes; shutdown of school libraries; curtailing of arts and sports programs; and a widespread lack of technology and basic supplies such as books, paper, pens, and even toilet paper.

In the face of such challenges, it is not surprising that student outcomes suffer. Teachers may leave their positions in frustration, transferring either to more stable schools in the city or out of the SDP altogether. Retaining teachers can be difficult for struggling schools, and a high turnover of faculty not only increases instability in schools, but also weakens communities where effective education is needed most.

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*Alan J. Lee is the Founding Director of the Teachers Institute of Philadelphia.*

Some effective approaches to supporting teachers are to provide educators with rich professional development, and to create appropriate curriculum to enrich students' experiences. The Teachers Institute model addresses these necessary components of real needs at the classroom level. This specialized form of professional development is unique in its emphasis on strengthening the content knowledge of teachers (as opposed to pedagogy, which dominates much of teacher training); in its long duration (two-hour weekly sessions for fourteen weeks); in its requirements for in-depth research and curricular development; and close working contact with top scholars in their respective fields.

Research has indicated that academic preparation of teachers is a key determinant in predicting successful student outcomes. The ultimate beneficiaries of this intensive training are the students who will meet engaged, confident teachers who have high expectations for their students' success.

Our annual program evaluations have reported tremendous enthusiasm among participants for the Institute experience. Year after year, there is near-unanimity in these surveys in agreeing that TIP seminars are useful to teachers in the classroom. Given that the program usually demands a commitment of an estimated 40 to 60 hours of teachers' time, and presents a template of high standards for the creation of curriculum units, teachers eagerly enter the program aware that they will be challenged by the demands. Yet each year half of all participants are teachers returning for more training after an experience in some previous year.

Why would teachers, many of whom feel overburdened, put themselves in such a demanding situation? Why do they return to this challenging program again and again?

It may be counterintuitive, but teaching is often a lonely endeavor. While in the presence of large numbers of children and younger people for many hours, teachers have quite limited time with other adults with whom they want (and need) to com-

pare notes, share resources, brainstorm strategies, exchange perceptions of problems, and engage in myriads of other interactions that professionals in any field need to do in order to be effective. Productive interaction is difficult to build into the school day on a regular basis: lunch is lunch (for 30 minutes), prep periods are often taken up by the need to attend to short-term demands such as making photocopies, filing paper work, grading papers, attending an administrative meeting/conference — or just catching a breath and enjoying a cup of coffee.

Teachers benefit from professional collaboration with their colleagues, and a shared mission with school administrators. Where teachers are isolated and feel little incentive to take on leadership roles among their colleagues, outcomes suffer, and turnover and instability will often be high.

In a TIP seminar, part of the richness of the experience comes from the intellectual stimulation of the academic materials presented by the university scholars. But in seminars, there is also the exchange of classroom perceptions, concepts of potential teaching strategies, revelatory personal anecdotes, tips about sources of educational materials, and wider awareness of how the education system works within the School District. Institute seminars are one of the few places where teachers spanning the range of grades K through 12 sit at the same table, with the diversity also extending to wide ranges of teaching experience, and sometimes multidisciplinary subject expertise.

Institute teachers find that they are not alone: their experiences and challenges in the classroom are not unique, but rather shared by others who may have notions of how to cope successfully with such problems. The construction of these professional networks of educators across grades, subjects, schools, and levels of experience breaks down isolation and allows educators to be mutually supportive, even empowered, within the larger dynamic of the school system. Further, such

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# Treating Teachers with the Respect They Deserve

By Raymond F. Theilacker

*Editor's Note: The Delaware Teachers Institute has recently received gratifying public acknowledgment. In "Delaware's Plan to Ensure Equitable Access to Excellent Education for All Students, 2015-2025," the Delaware Teachers Institute is cited, under Strategy 5, as an ideal model for "Enhanced Professional Learning Opportunities for All Delaware Educators." The Plan emphasizes that "by developing teacher leaders in individual schools serving high-need student populations, the Institute strengthens the schools' learning environment."*

**A** Teachers Institute in Delaware was first envisioned in the spring of 2004, when a young colleague and I were invited to apply to the first seminars offered in the Yale National Initiative. At the time, I had been a classroom teacher for almost 35 years, and was very skeptical of any brand of professional development, having endured many years of one-size-fits-all programs that were guaranteed to change instruction, boost student achievement, refine curriculum, streamline classroom management, improve school climate, enhance labor relations, create strong interpersonal relationships, and remove warts. Now, as I leave service in the role of founding director of the Delaware Teachers Institute, my thoughts and emotions wrestle with one another for dominance in choosing the best things to say about the Institute's brand, and how Institute participation plays a role in supporting and retaining teachers, particularly among the highest need student populations.

On the support side, which I believe is the Institute's greatest strength, there is the not-so-obvious effect of treating teachers with the respect they so richly deserve. Institute seminars bring teachers to the

*Raymond F. Theilacker was the Founding Director of the Delaware Teachers Institute in New Castle County.*

table as peers with their university colleagues, as well as with coworkers from a variety of grade levels and often from other core subjects. Any experienced Fellow will vouch for the sense of value felt at the seminar table — value derived from being able to share their unique discoveries, inventions, and training with others, and the value of gaining similar knowledge from their associates.

I don't think this feature of Institute protocol can be overemphasized. In the 40 years I spent in the classroom, there were precious few times I felt valued by my colleagues or supervisors. Validation is *not* built into the teaching profession — in fact my own experience has borne witness to regular characterization of the profession as blue collar work, which of course it is not; but an objective look at the job elements, pay, and working conditions would make any outsider think that it is. Add to these factors continuous public criticism for low scores and perceived inferiority on an international scale, and you might well ask why anyone would aspire to become a teacher. Nevertheless, the public schools are filled with many fine teachers whose chief concern is the well-being and positive growth of the young people they serve. Institute seminars acknowledge and revere teachers for what they know and what they do. I believe that this is enough to keep teachers in the profession, and indeed to create a new breed of teacher leaders.

Delaware — as is the case in other Teachers Institute locations — has seen the steady growth of teacher and faculty participation throughout the four partnered school districts, and the establishment of a very stable network of teachers who serve in various leadership roles. More than 150 teachers have earned fellowships, and more than half of those have returned for at least one more seminar. The leadership to which I refer takes several forms. First, teachers from various school sites (numbering over 35 in Delaware) are invited annually to serve as

Teacher Representatives in their schools. Responsibilities include: acting in the capacity of liaison with the teacher(s) in their districts who sit on the Institute steering committee; polling teachers annually for those topics on which they would like seminars developed; serving as content experts in the topics on which they have written curriculum units; sharing curriculum units with local faculty; representing and promoting the Institute with building principals and curriculum officers; helping with annual open house events; and recruiting teachers to participate in seminars.

Another way in which a teacher can take a leadership role is serving as a seminar Coordinator. In addition to helping the seminar leader with clerical and organizational tasks, teachers can and do become mentors, writing partners, professional resource persons, and friends to their fellow seminarists. The third role teachers in Delaware can perform is that of Teacher Leadership Committee person. In this steering group, teachers develop calendars, create policy, oversee and modify all Institute events and activities, represent the needs and desires of the teachers in their districts, and work personally with district superintendents and curriculum officers. The eight teachers in this group have consistently shouldered the responsibilities of leadership in as serious a fashion as I have seen in my career. The result is an intense loyalty to the Institute and the strong will to see it flourish and grow into more school districts.

My experience is that teachers are eager to take on leadership responsibilities to promote their Institute, their own learning, and quality instructional planning for their students. Doubtless many have resisted moves and even "promotions" to serve in these capacities. I am proud to have been instrumental in bringing this enormously important organization to Delaware, but am more proud to enter retirement having worked with teachers — the finest people there are.

# Can We Teach the Common Core Standards in Mathematics?

By Roger E. Howe

The Common Core State Standards in Mathematics (CCSSM) attempt to define what mathematics students should know and what kinds of mathematical tasks they should be able to accomplish at each grade level, K-8, and over the course of their high school careers. They are the most recent product of the standards movement in mathematics, which first burst on the national scene in 1989 with the release by the National Council of Teachers of Mathematics (NCTM) of their Standards for School Mathematics. This document was widely influential, and resulted in adoption of mathematics standards by most states. The original NCTM Standards were refined in the Principles and Standards for School Mathematics, released by NCTM in 2000.

However, all these documents suffered from the curriculum bloat endemic in the U. S. in the late decades of the twentieth century: too many topics treated too superficially. William Schmidt of Michigan State University, who studied curricula in many countries, popularized the phrase "mile wide, inch deep" to characterize this situation, and pointed out in many talks in many places that high achieving countries had curricula that were much more focused on a year by year basis, although over time they covered most of the topics in U. S. curricula, and with better learning outcomes.

Comparative studies of state standards documents conducted in the mid-2000s also revealed many inconsistencies between them. Topics were introduced or emphasized in different grades, and in differing amounts and different orders, from state to state.

As a result of the incoherence of the state standards among themselves, as well as increasing perception of the incoherence of

*Roger E. Howe is William R. Kenan Jr. Professor of Mathematics at Yale University.*

the overall curriculum, there were calls for standards with more focus. A first response was produced by NCTM, with their document Curriculum Focal Points. This did not repudiate the PSSM, but attempted to identify at each grade level a small number of topics that merited emphasis, with the rest to receive reduced emphasis in that grade.

However, the call for "fewer, deeper, higher" sets of standards also attracted other groups. The Council of Chief State School Officers (CCSSO), and the National Governor's Association joined



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forces to produce the CCSSM. This was a several-year process, and since they were completed, the CCSSM have (with strong encouragement from the Federal government) been adopted by nearly every state (with a few since rethinking their position).

By and large, the CCSSM do adhere to the "fewer, deeper, higher" motto that motivated their creation. Also, and quite importantly from my perspective, they incorporate genuine improvements in pedagogical approaches to some of the bedrock topics

of any math curriculum. One of these is place value, an idea that shapes most of our day-to-day practice of arithmetic, but which was largely neglected in U. S. curricula, except as embodied in procedures. Another is fractions, which are to be approached through unit fractions, conceived of as new units. Our national seminar in 2014, on "Place Value, Fractions, and Algebra: Improving Content Learning through the Practice Standards" gave a lot of attention to fractions, which formed an important part of the curriculum units of several Fellows. The unit fraction approach was well received. At the fall reunion, one Fellow reported that, after he taught his unit, several of his students expressed outrage that they had not been shown the unit fraction approach in earlier grades.

So, will the CCSSM improve mathematics achievement in the United States? If they are well implemented, they have the potential to do so. However, there are many reasons for pessimism. The main ones are outlined by Elizabeth Green in her recent book, *Building a Better Teacher*, and the associated *New York Times Magazine* article, "Why is Everyone Afraid of the Common Core?"

Standards should be viewed as aspirational documents – they describe what we hope our students will learn. What students actually do learn depends on what teachers do in classrooms. To realize the potential benefits of the CCSSM, what teachers do will have to change substantially from most current practice. Unfortunately, in the U. S. educational system, mechanisms to promote teacher change almost do not exist. Organized professional development is sporadic, top-down, and often not focused on subject matter. Also, teaching is conceived of as a private act driven by innate talent, not as a skilled activity that can be communicated and improved by collaborative effort. Improvement of teaching is seen as an individual responsibility, and

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## Fry: Knowledge to College

essentially a volunteer activity, to be done in "spare time." The CCSSM may well end up another victim of this systematic neglect of improvement. The issues are clearly described by Elizabeth Green, concentrating mostly on the example of Japan. Green explains that high-achieving countries have regular mechanisms for teachers to improve their practice, and to spread effective practices. In Japan, teachers engage in lesson study: groups of teachers select a topic and meet over the course of a year to design the best lesson they can think of on the topic. The group may be advised by a faculty member from a local university. The result of their deliberations is then tested on real students, with all group members observing, then analyzing the results. Such public lessons take place in individual schools, in districts, and even in whole regions.

There are analogous mechanisms in China. Teachers have several hours each day for background work and for conferring with colleagues. There is regular visiting of classrooms of one teacher by another. They have a 3-stage career ladder for regular teachers, with more senior teachers mentoring newer ones, and then another 3 stages of "super class teachers," who study effective modes of presentation for particular topics, publish papers on such research, and organize professional development for the regular teachers.

The Yale-New Haven Teachers Institute and Yale National Initiative are not the same as either of those systems, but they share with them the features of being in substantial part teacher-driven, and of having collaborative professional improvement as a significant part of their activity. One of the reasons I keep coming back to run seminars for the Institute is the enthusiasm I see in the Fellows, and I know a large part of that enthusiasm comes from the chance to work with similarly dedicated colleagues. It is symptomatic of the tragedy of U. S. education today that the Teachers Institute is such an exceptional form of professional development.

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city, not exactly on the hill, as this is a realistic picture and not an allegory, but shining nonetheless with the promise of betterment. To see this clearly, we need to forget that today Brooklyn is itself "the new Manhattan," and remember when Brooklyn had no status at all. When a new baseball team arose there in 1884, significantly a year after the bridge opened, the team, its official name from 1895 on referring to Brooklynites' agility in dodging the new electric streetcars, would soon enough be called "dem Bums."

The Yale-New Haven Teachers Institute and Yale National Initiative support high-need schools of the sort that Brooklyn had in 1916. Our mission is to build a bridge, amply supported, that can take students to a better place while retaining their teachers where they are most needed. The bridge takes people back and forth, and that suggests flexible mobility, not just the apathetic "some go up, some go down," as though quality of education didn't matter. Our bridges start people in grim inner cities from which there is seemingly no exit and take more and more of them to a shining city, from which they may well wish to return to enlighten their place of origin.

We emphasize high-need schools. An important reason to support teaching in high-need schools was highlighted at the January White House Summit on College Opportunity that was attended by Yale's President Peter Salovey, as he indicates in our inspiring lead article. It was agreed on that occasion that one of our highest national priorities is to facilitate the admission of high-need students to college. Not just to Yale, though, or to private institutions like Yale, but to colleges everywhere, from State and Land Grant universities to community colleges. Dedicated teachers are required to raise students' abilities with this goal in view, but it is also a matter of creating aptitude, of making students aware that college is both accessible and important for their

futures. Teachers who have experienced a collegial relationship with university professors will themselves see the transition to college more vividly and support it as a goal within reach.

I think that's one of the most important and interesting themes of the essay in this issue by former New Haven teacher Jane Marshall. She starts her essay by stressing the contrast between Yale and her nearby place of work, Richard C. Lee High School; but then she describes a transformation. As a person for whom the aura and perhaps also the supposed pedantic irrelevancy to real life of a college professor was repeatedly demystified in happy collaborations, Jane Marshall was herself more attuned to college teaching than she was even as a college student, and more ready to point her students toward college as a natural outcome, not an unnatural leap. The image that accompanies her essay, the famous *Life* photographer Gordon Parks' "Emerging Man, Harlem," not only repeats the theme of the Greacen painting, it reflects her experience in one of her many inter-arts Institute seminars, "New York City Photography and Poetry."

We are honored to present the article by the Chairman of the National Endowment for the Humanities, William D. Adams, who describes the NEH's long involvement in the funding of our seminars in the Humanities, and goes on to celebrate the power of the Institute model, making what headway it can against the many obstacles he describes that are faced by teachers in the trenches today. We are likewise honored to have two articles by Ellen Kisker, the statistical and social policy analyst of Twin Peaks Partners LLC, who works closely with the Institute to find the most effective means of evaluating our program. The first of these articles, available in extended form as a brochure, outlines Kisker's "theory of change," her longitudinal study of teachers' reports concerning their seminar experiences and their lasting effects. Her

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# Collegiality, Creativity and Continued Learning

By Jane K. Marshall

I must confess; at first I was skeptical about taking part in the Yale-New Haven Teachers Institute program. As a second-year teacher, I was full of self-doubt. All I wanted was practical advice — including ready-made, sure-fire lesson plans. My school, Richard C. Lee High School, now defunct, was barely a mile from Yale University, yet it seemed a world apart. Comparing the buildings was telling in itself. The high school, made almost entirely of concrete, was set low and surrounded by what was called "the moat," where teachers parked their cars. The very word, moat, projected the feeling of siege. The University, on the other hand, offered "dreaming spires" and lovely courtyards. And anyone could see that the experiences of university and public school teachers were vastly different. Professors worked with complex, even esoteric ideas, and taught older, eager students. Public school teachers were kept busy trying to convince younger students that their very subjects were worth studying in the first place. In short: University and public school teachers in the same classroom? How could a bridge between these worlds possibly be created? I would learn that the bridge was the Institute's belief in parity among all participants. The common ground was mutual, abiding regard for ideas having to do with content — and the means of imparting said content to students.

Relationships are worthwhile only when both parties are learning. As it turned out in these seminars, university and public school teachers would both learn. Professors would learn about the reality of public education in the inner city, and come to appreciate the creativity required for good public school teaching. Public

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*Jane K. Marshall was a Teachers Institute Fellow ten times between 1980 and 1989 while she taught English at Richard C. Lee and Cooperative Arts and Humanities High Schools in New Haven, Connecticut.*

school teachers would tap into a wealth of knowledge. In free-wheeling seminar sessions, all would enjoy the give-and-take of ideas. Collegiality was there from the outset. For example, public school teachers shaped seminar offerings by suggesting topics of particular interest. University professors altered syllabi to reflect the topics for curriculum units put forth by teachers. Teachers realized from first encounters with the Institute that their own ideas were both valuable and valued.

Teachers Institutes are havens for public school teachers; places where content areas are revered and enhanced through exciting connections; places where teachers at all levels are encouraged to teach with the needs of students placed foremost; places where mutual regard is celebrated; and — perhaps most important — places where the creativity so necessary for successful teaching is recognized and applauded.

Early on in my career, I realized that my students were primarily visually-oriented, hence often uninterested in the written word. I thought I might use this realization in constructing a curriculum unit to counteract my students' aversion to poetry. My first unit, "Poetry and Paintings: A Comparative Study," would enable students to think harder about what we see and what we read. The unit considered elements inherent in both paintings and poetry: mood, metaphor/symbol and pattern. For example, students explored the mood of Picasso's *The Old Guitarist*, considering color, shape and sensory imagery. They were intrigued by this "non-English" activity. When we paired the Picasso with Robert Frost's "An Old Man's Winter Night," they saw that poetic devices such as metaphor, personification and sensory imagery are visual as well.

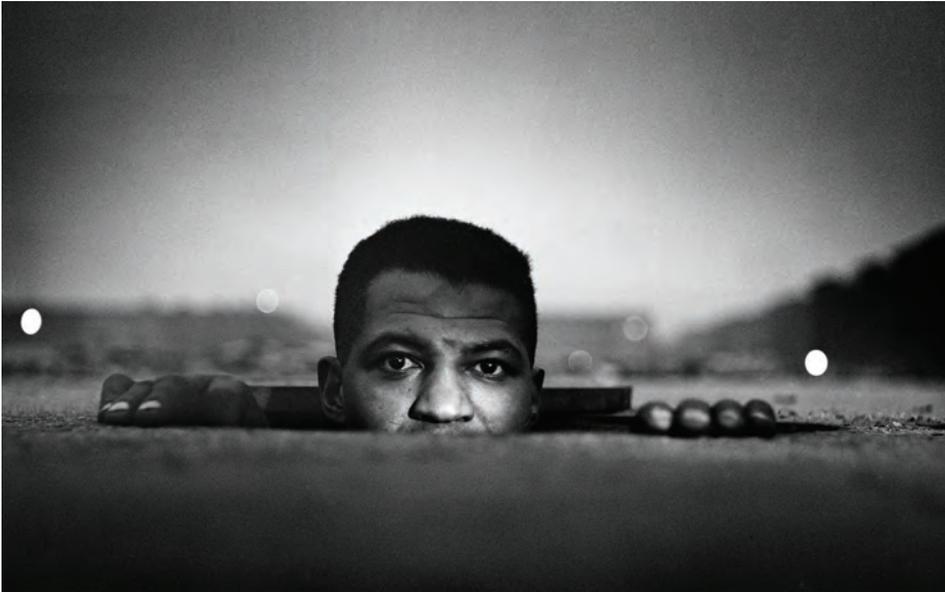
A later seminar, "Time Machines," returned me to comparisons of paintings and literature. Following seminar leader Jules Prown's theory of material culture, we learned to practice three main forms of analysis in order: description, deduction

and speculation. This theory of analysis, akin to "close reading," could be applied to literature as well. I provided a new pairing — this one of Mark Gertler's image *The Merry-Go-Round* with D.H. Lawrence's story "The Rocking-Horse Winner." Such an approach fosters higher-thinking skills. No longer could Hester, the mother in "The Rocking-Horse Winner," be seen merely as a greedy woman. Students would also find responses to 20th-century mechanism in both the painting and the story.

A happy by-product of material culture analysis is the structured context for expository writing that it provides. Students could easily follow the three steps in constructing essays. A beginning, middle and end could suggest themselves naturally. With practice, students would become proficient in applying the steps on their own. In the long run they could engage independently in analyses of paintings and stories — becoming cultural historians, in a sense.

Wisely, Teachers Institutes enable teachers to cross disciplines. I was able to work with history and art history professors as well as English professors. In time I would create an entire course simply called "Visual Art and Literature" — its more formal title: "Exploring Literature and History through the Visual Arts." I felt that such an approach enabled students to see the interrelation of disciplines and de-compartmentalize students' perceptions, the basis of comments like: "Writing is for English class. Why do we have to write in history or art classes?" or "What is the point of literature? I'd rather study what really happened in history class."

Other seminars likewise inspired course development: "Arts, Artifacts and Material Culture," "The City in American Literature and Culture," "Time Machines: Artifacts and Culture," "Society and the Detective Novel," "Writing about American Fiction" and "Detective Fiction: Its Uses as Literature and History." Aided by seminars such as these, I continued to



GORDON PARKS, *EMERGING MAN*, HARLEM, NEW YORK, 1952

consider social or cultural history as revealed in various written and visual art forms. For example, students would study 1930s Britain by way of non-fiction (excerpts from George Orwell's *Down and Out in Paris and London*), fiction (Agatha Christie's *The ABC Murders*) and two Alfred Hitchcock films of the period. We noted the similarity of themes in all these works. Also, students took note of variance in style. They would learn to evaluate the varying projections of social history while acknowledging such topics as intended audience, voice and audience expectations.

Yet other curriculum units included: "New York City Photography and Poetry" (in which students learned the elements of photography and poetry against the backdrop of three distinct time periods) and "America in Film and Fiction" (in which students identified the social concerns of America in the 1930s and early '40s while gaining exposure to the elements of filmmaking as well as the short story). Eventually I created "American Detectives: On TV and in Books," enabling, once again, a look at social concerns in three time periods. Students were asked to respond to fiction and television

critically — coming to understand the idea of "popular culture" and recognize its role in social thought formation.

I have always wanted students to enjoy the freedom that comes through active engagement with others' expressions and viewpoints. I believed that they would become astute consumers and judges of popular cultural representations (which affect us all: here I am recalling an offensively egregious re-telling of John Ball's *In the Heat of the Night* as a television series) as well as better critics of art that isn't ephemeral.

Just as important as content is the writing requirement in Teachers Institutes. These units were possible because I approached content and pedagogy through writing, which, in its process, fostered a better-focused and more precise realization of goals. Through writing, what I had discovered was transferable to others. Thus learning and teaching kept interacting. The effective teacher remains forever a student. Teachers Institutes don't just provide the opportunity to learn methods, to enjoy broader reading or to learn from the expertise of professors, as important as these opportunities are. Teachers Institutes enable personal and intellectual develop-

ment — that which we seek to encourage in our own students.

When I was a second-year teacher, I just wanted practical advice, with tested lesson plans. Later what seemed to matter most was having somewhere to expand my knowledge and to think. That was a giant step forward. Had I not experienced the process of seminars and writing — had I not felt encouraged to continually learn — I might not have enjoyed success. In fact, I very much doubt I would have "stayed the course" teaching in New Haven public schools. In short, the Teachers Institute experience made teaching at Richard C. Lee High School, and later The Cooperative High School, possible for me.

With Institute curriculum units in place, I witnessed remarkable student transformations and changes in attitude toward my subject, English. Hence the teaching experience became a rewarding one. I should emphatically add, too, that my students became my instructors, because they and their needs required me to become a better, more creative teacher. The Teachers Institute provided a very necessary support, and an impetus to continue on. As I became a better teacher, the resilience and courage of my students became apparent to me, reinforcing my commitment to New Haven public schools. What I have learned during my career is personal as well as professional. "And that," as Robert Frost once wrote, "has made all the difference."

I should emphasize that my story is but one of many. Experiences in Teachers Institute programs in a variety of locations result in successful teaching and learning outcomes for many teachers and their students. The university-school bridge (about which I was initially skeptical) has been replicated in effect within the walls of hundreds of public school classrooms, enhancing teacher-student interactions and the learning process in general. These bridges have proven to be substantial, enduring — even crucial — as we endeavor to provide meaningful, equitable school experiences for all students.

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# The Teachers Institute Approach to Supporting Teaching and Increasing Retention

*Ellen Eliason Kisker*

School district officials often cite high teacher turnover in schools serving disadvantaged students as a key challenge in their efforts to improve achievement and reduce the achievement gap. Teacher turnover can be detrimental to instructional quality, and replacing teachers requires financial resources that could otherwise support classroom teaching.

The Teachers Institute approach to professional development is designed to strengthen teaching in high-need public schools through university-school partnerships in which university faculty and public school teachers work collaboratively in seminars on topics suggested by teachers. Developers of the Teachers Institute approach expect that by increasing collegiality among district teachers and university faculty, by providing teachers with opportunities for leadership while they remain in the classroom, and by increasing teachers' confidence in their teaching, the Institute will increase the likelihood that teachers will remain teaching in their current district and school.<sup>1</sup> Surveys of participants confirm that their experiences in the Institute seminars have supported their commitment to teaching in high-needs public schools.

This article describes the scope of teacher turnover in the U.S., identifies the key factors that research shows are associated with high teacher turnover, and presents evidence that the Teachers Institute approach to professional development can promote higher teacher retention.

## **High Teacher Turnover Rates Impede Progress in Raising Student Achievement in High-Poverty, High-Minority Public Schools.**

Teacher turnover rates are relatively high. About 15% of public school teachers leave their school each year, half to teach in another school in the following year and the other half to move out of the teaching profession.

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*Ellen Eliason Kisker is Managing Partner of Twin Peaks Partners, LLC.*

Turnover is even higher among beginning teachers and teachers in high-poverty public schools. One quarter of beginning teachers leave their school after one year. Of these departing teachers, about 60% move to a different school, and 40% leave teaching. High-poverty public schools lose about 20% of their teachers each year.

Persistent high teacher turnover leads to instructional, financial, and organizational problems that can interfere with trusting relationships between teachers, students, and parents and directly affect student learning. Maintaining high quality instruction is especially difficult when turnover is high. In schools with high teacher turnover, students are taught by a higher proportion of new, inexperienced teachers and teachers who have been reassigned to teach a grade they haven't taught before, both patterns that lead to disruptions in instruction, lower instructional quality, and lower student achievement.

When teacher turnover is high, schools must repeatedly recruit, hire, induct, and develop replacement teachers, all activities that are likely to divert financial resources away from classroom teaching. Thus, schools with high teacher turnover also may have fewer resources for curriculum, materials, and professional development for teachers.

High teacher turnover also may impede the development of strong collegial relationships among teachers, lead to the loss of institutional knowledge, and make teachers reluctant to take on leadership roles. These effects may in turn limit the school's capacity for instructional improvement and limit achievement among all students, not just those whose teachers left.

## **Poorer Working Conditions Contribute to Lower Teacher Retention Rates in High-Poverty Schools Where a Stable Teaching Staff is Needed Most.**

A range of working conditions matter to teachers, but research shows that the most important are the ones that shape the social context for teaching and learning and

make effective teaching possible. Teachers are more likely to stay in schools with supportive principals; schools where teachers network, collaborate regularly, and learn from one another; and schools with a positive work culture, a strong sense of collective responsibility, and norms for behavior and high expectations among fellow teachers and students. Teachers want an intellectually stimulating community in which they can experience a sense of learning, changing, and growing. Status and respect for teachers also influences teacher retention.

Teachers in schools with more low-income students or higher proportions of minority students are more likely than teachers in other schools to report poorer working conditions. New teachers in schools serving disadvantaged students, for example, are less likely than their counterparts in other schools to report receiving mentoring, curriculum support, and collegial support. These poorer working conditions likely contribute to the higher teacher turnover, lower teaching quality, and lower student achievement found in high-poverty and high-minority public schools.

## **Participation in a Teachers Institute Can Provide Support that May Promote Higher Teacher Retention.**

Teachers Institutes create partnerships between school districts and local universities or colleges to provide professional development in a way that offers the kinds of support teachers need to remain teaching in high-poverty, high-minority public schools. Teachers Institutes offer teachers an intellectually stimulating opportunity to learn along with other teachers in their school and district. Institutes are carefully designed to respect and build on the pedagogical expertise that teachers bring to the Institute seminars. The roles of seminar leaders and teachers are defined, and teachers receive a stipend in recognition of their time and effort. Teachers Institutes provide intensive professional development, one of the four components of comprehensive induction programs. The

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Institutes also provide curricular support and access to collegial support in improving pedagogical practice.

When working conditions in a school are poor, teachers' experiences in the Teachers Institute seminars may help counterbalance the conditions in their school and provide some of the support they need to remain in their current teaching position. When teachers are unable to develop strong collegial working relationships at their school, the opportunity to work with other district teachers in a Teachers Institute seminar may provide some of the professional interactions and feedback that teachers, especially new teachers, need. The supportive relationships that teachers form often continue beyond the Institute seminars.

*Due to the fact that my experience in the Institute program has been such a positive one I would like to continue the process of curriculum development and to encourage other teachers to participate and reap these benefits as well. It is my intention to remain at my school district as a classroom teacher for the foreseeable future.*

By providing opportunities for leadership without leaving the classroom, the Teachers Institutes also may facilitate leadership in other school-wide decision-making and increase the likelihood that teachers remain teaching in their present school. Teachers Institutes have sparked some teachers' interest in curriculum and led them to participate in school or district committees addressing curriculum issues. Other teachers have reported that serving as a Teacher Representative or seminar Coordinator has helped them develop leadership skills and apply them in their school, thereby gaining their principal's recognition for taking initiative and providing leadership in their school. In one high school where several teachers have participated in the Yale National Initiative, the teachers have stepped into department leadership positions and continue supporting each other and working

together to improve teaching and learning in their school.

By offering teachers the opportunity to learn together in a collegial setting and by facilitating professional relationships among teachers in different schools in the district, the Teachers Institutes may over time build collegial relationships among teachers in a school and in the district that support teacher retention in the school and district.

The focus of teachers' work in the Teachers Institute is the development of a curriculum unit that the teacher can use in his or her classroom the following year. Through this work, teachers take the initiative to improve the curriculum; they fill gaps in the school's curriculum or supplement it with new material that addresses standards.

*Every year I make new contacts and connections across the district that serve to give me a stronger sense of a New Haven teaching community. This is a strong factor in why I never left the district, even when other districts were offering more money back when I started teaching.*

At the end of their Institute seminar, most teachers report that they expect to remain in teaching in five years, but a few teachers indicate that they expect to take an administrative position, go to graduate school, or retire. Among those who expect to remain in teaching in five years, most expect to remain teaching in their school (68% to 82% across Institutes in 2014) or in their district (9% to 16% across Institutes in 2014).

Some evidence exists showing that Teachers Institutes may increase teacher retention. Among teachers who had participated in the Yale-New Haven Teachers Institute during or before the first year of the study (2000-2001), 63% were still teaching in the New Haven School District five years later, compared with 43% of teachers who had not participated in the Institute. After controlling for race, sex, and years of teaching experience, the

analysis showed that teachers who had participated in the Institute by 2000-2001 were almost twice (1.93 times) as likely to remain teaching in the district in 2004-2005.<sup>2</sup>

### **Conclusion**

Lower teacher retention in high-poverty public schools remains an obstacle to instructional improvement, student achievement gains, and reductions in achievement gaps. Multiple factors influence teachers' decisions to remain teaching at their school and in their district, including factors related to school working conditions, salary, and curriculum. Teachers Institutes address some of these factors by providing an intensive professional development experience that offers curricular support, fosters collegiality and new professional relationships with other teachers in the district, and encourages teacher leadership without leaving the classroom. Teachers who participate in Teachers Institute seminars express a strong commitment to teaching in their school, and data show that they remain at higher rates than other teachers in their districts. More research is needed to reach causal conclusions, but the Teachers Institute is a promising approach that supports teaching in high-poverty public schools not only by increasing teachers' content knowledge and their confidence in teaching it but also by supporting retention of teachers in their schools and districts.

### **Notes**

This article presents principal findings from a longer report with complete citations that can be found online at [teachers.yale.edu](http://teachers.yale.edu). A large number of references were reviewed during preparation of the report and this article.

1. Kisker, Ellen Eliason. (2011). The Teachers Institute Theory of Change. *On Common Ground*, Number 14, pp. 4-7.
2. Smith, Rogers M. (2009). *To Strengthen Teaching: An Evaluation of Teachers Institute Experiences*. Philadelphia: Rogers Smith.

# The Diné Nation on Common Ground in Healing

By W. Mark Saltzman

I met Jolene Smith in May of 2011, early in her first trip to New Haven. I asked Jolene, "What do you think of Connecticut?" She answered, with a wide smile, "Everything is green and wet," an excellent description of a difference between springtime in New Haven and Jolene's home in Kayenta, Arizona. Jolene is a teacher-leader from the Diné Nation, a collection of public school districts that participates in the Yale National Initiative.

That year, I was leading a seminar on "Organs and Artificial Organs," in which Jolene was a Fellow. The seminar presented an overview of human bodily functions by considering each major organ, one at a time. The structure of each organ, as well as its arrangement of parts, was examined with attention to how that structure leads to reliable, efficient function. We also discussed approaches for making artificial kidneys, hearts, blood vessels, and nerves, which can be used when organs fail. During this seminar, Jolene prepared a unit aimed at upper elementary students, such as the 6th graders that she teaches. The unit — called "Diabetes, The Silent Enemy" — describes the essential functions of the pancreas, with particular attention to presenting these physiological concepts together with the Navajo Philosophy of Life and Navajo language. I was deeply impressed by Jolene's ability to put this human burden in the context of how insulin works, as well as by the challenge she faces when guiding her students to reconcile their natural heritage with the "modern" approach to medicine that dominates in the U. S. Through our work together on her curriculum unit, I learned from Jolene about the Diné Philosophy of Education and traditional forms of healing. Jolene's contributions enlivened our seminar discussions by challenging the group to think beyond Western modes in both education and medicine.

*W. Mark Saltzman is Goizueta Foundation Professor of Chemical and Biomedical Engineering at Yale University.*



HARRISON BEGAY, NAVAJO MEDICINE MEN MAKING A SAND PAINTING

My education in the tradition of Diné healing moved forward in 2012, when I led a seminar on "How Drugs Work." I was fortunate to have Jolene as a Fellow again, together with Marilyn Dempsey, a teacher-leader from the Window Rock Schools, also in northeastern Arizona. We discussed the biological basis of drug action, choosing examples of drugs that are used to treat common conditions such as heart disease, infections, pain, and cancer. This discussion led to a description of the chemical basis of drug specificity: why do drugs affect one condition (or one set of cells in the body) and not all others? Drug specificity is never perfect, so the seminar discussed side-effects, which are the most important limitation in our ability to design

drugs. The seminar used mathematics to describe the duration of drug action: what determines the frequency with which drugs must be taken? Finally, the seminar considered a remarkable feature of modern medicine: drug discovery is now accomplished using high-throughput techniques, in which thousands of prospective "drugs" are screened to identify compounds with the right biological and chemical activity.

Jolene and Marilyn prepared units on healing medicines in the Diné Nation. Jolene prepared a unit aimed at 5th and 6th grade students — called "Medicine between Two Worlds" — which describes herbs and their methods of preparation, and compares their healing effects to Western medicines. Marilyn wrote a unit

# Microbes Rule!

By Paul E. Turner

called "Diné Be' azee': Diné Traditional Medicine." Marilyn's unit, designed for 5th through 8th grade students, also introduces students to traditional methods for healing, emphasizing three sources of medicine: sage brush, juniper, and piñon trees. These units are now available for teachers throughout the world; they provide a sound bridge between the Diné tradition and our modern experience of drugs for treating disease. As I learned, these views are not far apart: many of the most popular and effective Western drugs are derived from plant sources, like the Diné sources of medicine. But there are also important differences, particularly in the modes of preparation and ceremonies that accompany the use of Diné traditional medicines. Jolene's unit describes beautifully the holistic process of traditional healing, which focuses on the entire individual, seeking what they call *hozho*, or harmony, order, balance, and beauty. Marilyn's unit focuses on the traditional methods of preparation of healing medicines from juniper, sagebrush, and piñon. With her focus on both healing and the Navajo language, Marilyn's written description of the plants and people that create medicines in the Diné tradition balances the past and the present, and offers deep opportunities for teachers to guide their students in embracing what is valuable in both worlds.

All of us in the Yale National Initiative were deeply saddened to learn of Marilyn Dempsey's death in March of 2014. Marilyn had a profound impact on the work of the Yale National Initiative, and on the individuals who worked beside her on her many trips to Connecticut. The Initiative is fortunate indeed that Jolene continues and expands the tradition of thoughtful, active leadership that Marilyn created. The Initiative has profited enormously from the participation of teachers from the Diné schools; these teachers represent a part of the nation that is different from New Haven in many ways, but shares in our commitment to students as our future.

In summer 2014, Kathleen Tysiak and Vanessa Vitug participated in my Yale National Initiative seminar, "Microbes Rule!" We emphasized how microbes, especially bacteria and viruses, dominate our planet and impact our lives in multiple ways. These microscopic creatures evolved billions of years before other organisms, and the early evolution of photosynthesis genes in bacteria led to elevated atmospheric oxygen levels, permitting later evolution of larger life forms with higher energy demands. We also discussed how microbes associated with the human body — the microbiome that outnumbers our own cells 10 to 1 — help us maintain healthy immune systems and proper body weight. The Human Genome Project surprisingly revealed that 10 percent of our genes come from viruses, which provide vital functions such as placenta formation. The seminar also emphasized the many negative impacts of microbes on our health and economy, especially the huge disease tolls exacted in humans and in agricultural plants and animals. Microbial diseases have changed the course of human history, as in the devastating 1918 influenza pandemic and the Great Famine, when microbes destroyed most of Ireland's potato crops. We learned that microbes rule the planet, affecting our lives for better and for worse.

The seminar also stressed how scientists and engineers are harnessing microbes to solve many of our most difficult challenges. Long ago, humans unknowingly 'domesticated' microbes to produce foods, such as yogurt, cheese, bread, and alcoholic beverages. More recently, we discovered that microbes could be used beneficially to exert warfare (biocontrol) against harmful microbes that threaten our food supplies, protecting multi-billion-dollar food industries from collapse. In addition, microbes are being developed to treat deadly diseases of humans, such as autoimmune disorders

*Paul E. Turner is Professor of Ecology and Evolutionary Biology at Yale University.*

and cancers. Microbes may even help solve humanity's energy problems by providing efficient biofuels and longer-lived batteries. This seminar explored the world of microbiology, allowing K-12 teachers to design curriculum units for subjects as diverse as biology, chemistry, mathematics and social studies.

Along with two books, *A Planet of Viruses* by Carl Zimmer (2011), and *The Amoeba in the Room: Lives of the Microbes* by Nicholas P. Money (2014), we discussed readings from magazines, newspapers, and online resources. Together with articles suggested by the Fellows, these readings concerned very recent discoveries in microbiology, together with topical issues such as the Ebola virus outbreak and controversies over childhood vaccination.

The curriculum units stemming from this seminar were highly diverse, reflecting the varied interests and backgrounds of the Fellows. They designed curriculum units for classrooms ranging from K through 12. Of these, the ones described by Kathleen Tysiak of Chicago and Vanessa Vitug of San José were especially impressive. Kathleen's unit, "Making Connections in Science: Viruses and the Immune System," is designed for high school students and provides an introduction to the essential role of the human immune system in combating disease pathogens. Kathleen also shows why there is continued difficulty in developing drugs that combat HIV, and highlights why the future of the human species will likely involve our ongoing battle against disease agents. Vanessa's unit, "It'll Make Your Skin Crawl — Microbes and Skin Physiology," shows how a curriculum unit can be used to enrich fundamental classroom instruction in human physiology. Her unit is designed to engage the interest of high school students, instructing them about the integumentary (skin) system. Her students use hands-on activities to gain a better understanding of how beneficial microbes interact with human skin to provide a protective barrier against infection by harmful microbial pathogens.

# Students Discover Their Inner Biologist

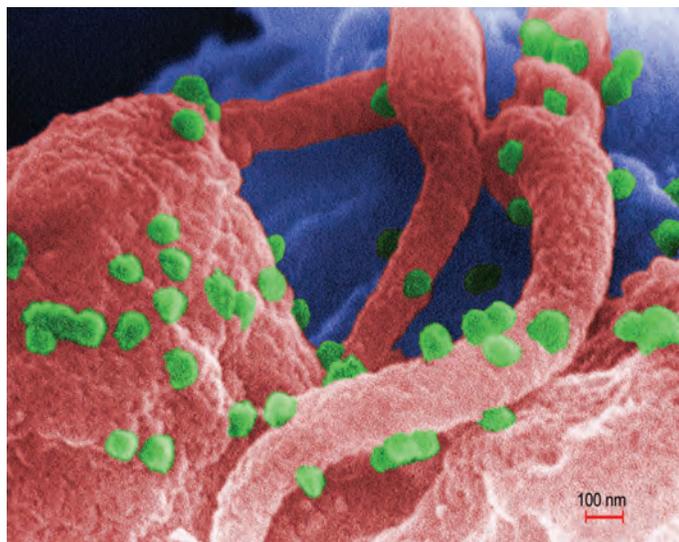
By Kathleen Tysiak

As a teacher, I aspire to create a classroom that engages my students; to develop lessons that allow my students to build their capacity as learners, as citizens, and as scientists while engaging in relevant material. This can be difficult to do in a time where there is pressure to "cover the curriculum" and help students earn the highest possible scores on exams. In trying to help my students become college and career ready, I often feel that there is not enough time to create the types of lessons that I desire for my classroom.

The Yale National Initiative allowed me to slow down, think about my students' needs, and critically examine my own AP Biology curriculum. After identifying gaps in my curriculum around viruses and physiology, I decided that I wanted my unit to focus on the connection between viruses and the immune system. Using YNI's resources, I was able to conduct research and find primary resources that allowed my students to engage in complex work and make their own connections in science.

As we began the unit as a class, students immediately began examining models as a source of information. Rather than simply focusing on vocabulary terms and concepts, they had conversations about purpose, form, and function. Knowing that the unit also encompassed information about viruses, students started making their own connections and asking questions. Within the first few days of the unit, students began shifting from a task-completion mentality to one that encouraged both curiosity and skill building. As we moved into the virus portion of the unit, I asked

students to examine models of various viruses in their textbook. They had to simply define a virus using various visual representations from the textbook. When checking in, I caught students reading parts of the chapter. When I reminded them to use the visual models only to create this definition, numerous groups responded by explaining that they had already come up with a tentative definition but had more questions of their own: The textbook had these answers and it was their right to see if they could find them. I found myself in a teacher's dream, watching students hungrily rush ahead to find more information from their textbook!



HUMAN IMMUNODEFICIENCY VIRUS, 1989

According to my students, the most exciting part of the unit was actually the supplemental text, Carl Zimmer's *A Planet of Viruses*. Students loved discussing the different types of viruses and finding fun facts and statistics. Reading excerpts from these texts and sharing information gave us a common fund of examples to discuss. As we learned more details about viruses, students kept coming back to these examples for building their own connections. Within a day of introducing the text, I had former students coming back to my classroom asking if they could check out the book to read alongside my current students. This

book also gave everyone a very accessible introduction to smallpox and HIV — both of which were used as case studies for exploring vaccines and the pathogen-host arms race.

As a teacher, my favorite part of this unit was actually watching my students tackle 30+ page literature reviews. When first presented with these papers, students were extremely frustrated. They wanted to give up and wait to be given the important information. When we chunked these texts, though, and had students engage in discussions, their confidence in reading scientific literature grew exponentially. These were no longer scary, impossible reading selections,

but authentic sources of highly relevant information. Students were exposed for the first time to the proper formatting of scientific writing. They also realized that the connections I had been asking them to make were actually themes that real scientists used in their own research. On one of the final days of the unit, I gave students an article from the Internet that gave an overview of why we still have no vaccine for HIV. My intention had been for students to use this to reach a cohesive conclusion about why this has been so difficult. Instead, they were up in arms. "Why would you even give us this? It doesn't even include most of the important details!"

In the world of education, we often throw around words like "authentic learning experience." This unit made that more than just a buzzword. As my students and I have watched the world get closer to a functional vaccine for HIV, I've observed them get excited about being able to express their understanding of the underlying methods that might enable the vaccine to work. I know that this unit helped my students gain skills they will need for college; but, more importantly, I have realized that the unit has revitalized the passion of us all for Biology.

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Kathleen Tysiak is a Science Teacher at George Westinghouse College Preparatory Academy in Chicago, Illinois.

# Of Microbes, Skin Wars, and Teenagers

By Vanessa Vitug

As a Physiology teacher, I'd mostly perceived germs as threats, harmful pathogens against which I waged war. Armed with cleaners and soap, I met the enemy on the frontline of my classroom. Intent on eradicating them, I waged chemical warfare on these microscopic creatures, fighting them on the surface of my classroom tables, on my students' hands, and on our bodies. Then, during the summer of 2014, I had the pleasure of participating in Paul Turner's seminar entitled "Microbes Rule!" Spending two weeks in the Yale National Initiative seminar on microbes completely changed my viewpoint, as I first learned to respect, and ultimately to love my enemy.

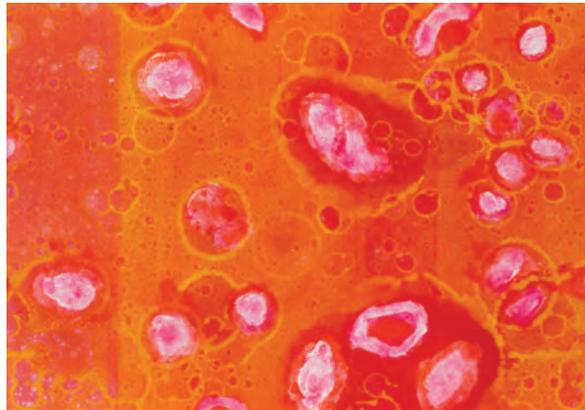
As a teacher whose focus has primarily been on human physiology, my own knowledge of viruses and bacteria was rudimentary at best. And so, just as teachers encourage students to challenge themselves with learning something new, I accepted Paul Turner's seminar as a challenge. Throughout "Microbes Rule!" our group of teachers explored the rich diversity of microbes; we learned about pathogenic bacteria and viruses, but we were also introduced to beneficial microbes that clean our oceans, and even digest plastics. The topics we discussed were varied and timely; we explored the possible cause of today's measles outbreaks, the controversy over vaccines, the historical impacts of smallpox, and the alarming danger surrounding bat droppings!

Textual discussions grounded in Carl Zimmer's colorful and insightful book, *A Planet of Viruses*, inspired and challenged our notions of man's prominence with such lines as, "There are more viruses on Earth than there are stars." With the realization of microbes' impact on humanity, I quickly came to realize that studying them

*Vanessa Vitug is a Science Teacher at Mt. Pleasant High School in San José, California.*

deserved a prominent focus within my human physiology course. To that end, after a summer's worth of reading, researching, writing, and editing I wrote a unit called "It'll Make Your Skin Crawl: Microbes and Skin Physiology." With guidance and support, I developed and designed an activity that would not only teach my students about human skin physiology but would also illustrate the dual role that microbes play in preventing and causing disease.

By October, it was time to present my students with a new challenge. Instead of delivering content by directing my students to simply learn skin physiology from pictures and diagrams, I sought to allow them to discover the skin's incredible ability to



RICHARD IRVING BOWMAN, *FLOATING NUCLEI*, 1987

act as a barrier against the teeming microbial world we live in through their own research.

My unit opened with a simple yet intriguing supposition: "You are at war, and unless you defend your castle (body) against the onslaught of microbes intent on commandeering your body's resources, these infiltrators will ultimately usurp your dominion and claim your castle as their own." Their challenge was to devise ways to protect their own skin (front-line defense) from being penetrated and infiltrated by microbes, both good (helpful) and bad (disease-causing). Using computers, cell phones, textbooks, articles, and videos, students researched and amassed informa-

tion about skin microbes throughout one week. In groups, they organized, prioritized, and gave value to the microbes in their arsenal. As their instructor, my role shifted from lecturer to facilitator, helping to guide their learning. Within a week's time, my 90 students amassed more information about their microbes than I could ever hope to teach in a month of classroom instruction.

As they assembled their chosen cadre of microbes that could infiltrate and weaken the skin's defense mechanisms, they learned to decide why one microbe is more pathogenic than another. Then, they explained why, alternatively, another microbe could act as an ally for its host, strengthening rather than weakening the castle. During the appointed Skin Wars (cue Star Wars themed music) Day, students manned their battle stations, armed with cards that summarized each of their researched microbes. In groups they battled against each other, presenting one offense card or defense card to each other. As they reasoned, defended, and counter-argued, my classroom became raucous and energized. Students cried, "There's no way your group's staph bacteria can go through all of the epidermis, it's not the strain that causes all those symptoms!" Their motives for learning the content transcended the assignment parameters, as students passionately defended and justified their claims.

For a concluding activity, students were asked to evaluate the unit. Every student felt that the activity was challenging and worthwhile. They loved the competition it inspired and appreciated being given the freedom to decide which microbes to research. Because of the time spent developing each unit, the feedback received on activities and content, and the chance to develop multiple modes of delivery, the unit has always been successful. I look forward to the time when I have enough YNI units to comprise a whole year's worth of lessons!

# Narratives of Citizenship and Race since Emancipation

By Jonathan Holloway

In 2012 I had the great honor of leading a Yale National Initiative seminar, "Narratives of Citizenship and Race Since Emancipation." The seminar examined key narratives of the African American experience since emancipation with a focus upon how these narratives address citizenship. We leaned heavily on primary sources of all types — film, literature, speeches, art, music — and cast an equally wide net when it came to authors — intellectuals, politicians, artists, and activists all had a say by the time the course was complete.

This seminar was a high-level version of the survey course that I teach at Yale each

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Programs like Yale National Initiative are absolutely vital if we are to have any hope of providing a proper education for our children.

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spring, "African American History: Emancipation to the Present." Because I was working with a population through the Initiative that had more life experience than Yale undergraduates it was a delight to be able to pursue the nuances that undergird such seemingly simple sentences like "What does it mean to be American?" Given the teachers' lived experiences with long-running debates about immigration, social services, trickle-down economics, wars on poverty and drugs, etc. (my goodness, these were peo-

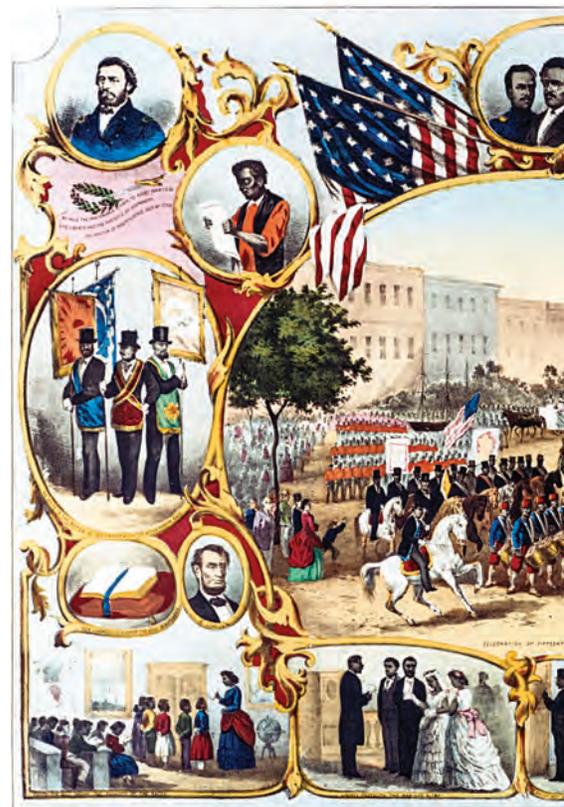
*Jonathan Holloway is Dean of Yale College and Edmund S. Morgan Professor of American Studies, African American Studies, and History at Yale University.*

ple who experienced the Cold War and were alive when the Berlin Wall came down and when tanks rolled through Tiananmen Square!), I was able to have much more engaged conversations about why we needed to pay such careful attention to our nation's narratives of exceptionalism.

Sydney Coffin's work is a case in point. Sydney (a very proud Philadelphian) developed "Putting Both Fists in the Air: The Addition of Women's Voices to the Black Power Era, 1960s-70s." This unit brought together Sydney's interests in literature, movement politics, social justice, and the intersections where race and gender reside. Sydney drew upon local Philadelphia figures, signaling to his students that exceptionalist histories of resistance and accomplishment were not just national narratives. Students in his class were going to learn that great people did great things on the very same neighborhood streets the students called home. As a way to reinforce the notion that his course was about local histories and that even "mere students" had an active role to play in shaping a national narrative, Sydney invited his students to craft spoken word poems that linked their experiences to black power, to activism, and to women's struggles. This was ambitious and inspiring work.

Fortunately, Sydney was well-prepared for the challenge. Like his colleagues in our seminar, Sydney was unafraid to speak openly about his frustrations with the quality of current debates about citizenship and about our national hesitancy to embrace all of our past, even when that past was unflattering. Indeed, my seminar participants were constantly supporting and challenging each other, asking pointed questions about their respective interpretations of the seminar's primary sources. The conversations were always moving forward. For the most part my job was to hold tight to the rudder so that we kept moving in the proper direction.

The Initiative is intense. We packed more into our two weeks together than I could have imagined. Mid-way through the second week I was exhausted — we all were exhausted. However, a few days later, as we were preparing to say our good-byes, I was already anticipating my return to the Initiative classroom. It was exhausting, yes, but working with these committed teachers was so inspirational, I



had to find a way to do more. As I began to think about my plans for a return to the Initiative in the summer of 2016, however, I received an invitation from Yale's president that threw a wrench in my plans: he wanted me to serve as the next Dean of Yale College.

I took up that post on July 1, 2014, and have been consumed in its demands ever

# Powerful Relevance in a Small World: Studying the Black Arts Movement in the Age of Michael Brown

By Sydney H. Coffin

"Black people are more than what people think"

— Duamel Santana, on the poem  
"2 b black" by James Emanuel

When I was a kid, I used to stare at a photograph I had found among the articles my father wrote as a reporter for the *Philadelphia Inquirer*; it showed a row of black men stripped down to their undershorts on a street sidewalk while Philadelphia police held guns in their hands. The image stuck with me, and when I participated in a national seminar called "Narratives of Race and Citizenship Since Emancipation" with Professor Jonathan Holloway as seminar leader, the photograph and its political content returned to haunt me throughout the creation of my unit.

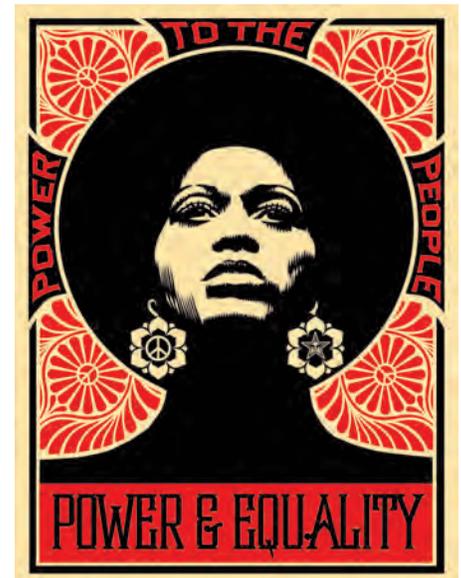
When Professor Holloway and I met for the first time in his office and I brought up the photograph, he suggested a number of useful books, including *Up South: Civil Rights and Black Power in Philadelphia* by Matthew Countryman, a graduate school classmate of his. In a small world moment, I told him I had grown up with Matthew Countryman in the Germantown section of Northwest Philadelphia.

Germantown was a hotbed of political activity in the 1960s-70s, and other childhood friends included Mungu and Morani Sanchez, twin sons of poet Sonia Sanchez, featured in the unit I was to write over the next several months. Sanchez, Nikki Giovanni, June Jordan, Carolyn Rodgers, the late Maya Angelou, and later Alice Walker, "spoke truth to power" as the Black Arts Movement gained momentum, leading to the women's liberation movement. With these women my focus, together with male figures Amiri Baraka, Ishmael Reed, James

*Sydney H. Coffin is an English Teacher at Edison/Fareira High School in Philadelphia, Pennsylvania.*

Emanuel, Clarence Major, and Etheridge Knight, among others, as the unit evolved my research expanded to include memoirs and criticism written by such luminaries of the time as Angela Davis, Elaine Brown, Assata Shakur, and Kathleen Cleaver, whose daughter, through another small world coincidence, was a classmate of mine at the same school from which the writer Alice Walker had graduated.

This year, when I taught the unit I created in the 2012 season of the Yale National Initiative, called "Putting Both Fists in the Air: the Addition of Women's Voices to the Black Power Era, 1960s-70s," I no

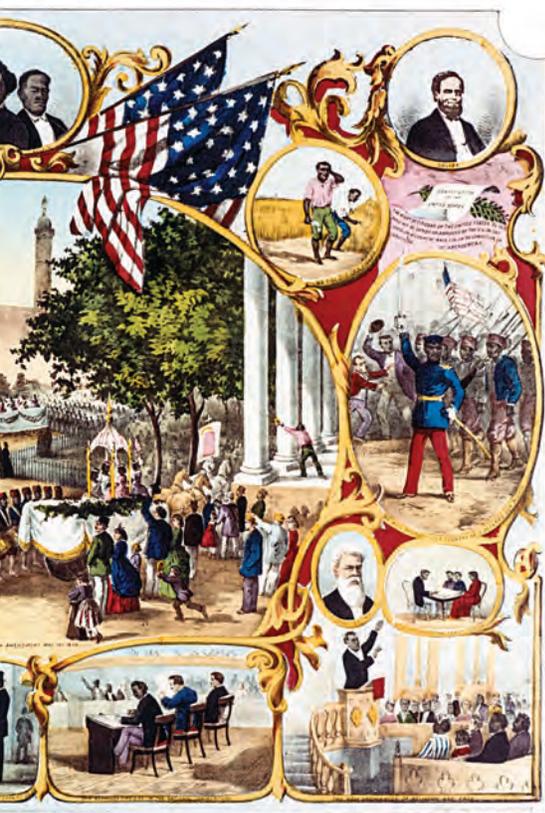


SHEPARD FAIREY, *AFROCENTRIC (RED)*, 2007

longer taught at the same school for which it was written. Nonetheless, and more than I could have predicted, the unit took on new life in my new school. Whereas initially I had imagined the unit as a precursor to understanding hip hop and the culture that evolved out of Black Power philosophy by the 1980s and 90s, at this time teaching the poetry arrived on the heels of Michael Brown's shooting, Eric Garner's public suffocation, and most recently the killing of an unarmed and handcuffed Freddy Gray in Baltimore.

(continued on page 33)

since. This is a complicated, time-intensive job requiring that I adjust my senses of scale and proportion. I now see in new ways the expansive reach of the college curriculum and the critical role that Yale faculty can play in shaping the next generation of learners — whether they be Yale students or Yale National Initiative participants. Although my schedule won't permit me to lead my own seminar any-



THOMAS KELLY, *THE FIFTEENTH AMENDMENT*, 1870

time soon I would be remiss if I concluded without reaffirming the value and importance of the Yale National Initiative. As I develop a broader understanding of our national educational climate, it is more evident than ever before that programs like the Initiative are absolutely vital if we are to have any hope of providing a proper education for our children.

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# Genetic Engineering and Human Health

By W. Mark Saltzman

During the summer of 2013, Laura Carroll-Koch participated in a Yale National Initiative seminar on "Genetic Engineering and Human Health." Nucleic acids, such as DNA, are the key information storage molecules of life. The study of nucleic acids is multifaceted: it involves examination of the structure and function of nucleic acid polymers, the capacity of these molecules to hold information, the changes in information content that happen upon modifications of nucleic acids, the diverse roles of nucleic acids in the life of a cell, and the characteristics that make them useful tools in biotechnology and bioengineering. Many diseases result from failures at the DNA level. These failures can arise from defects in genes themselves (causing genetic diseases) or in the regulatory regions of genes (causing cancer). Some diseases are the result of a defect in a single gene. Although most of these diseases are rare, a few — such as cystic fibrosis and muscular dystrophy — are relatively common. Scientists and engineers are now involved in the search for safe and effective methods for gene therapy in humans, in the

*W. Mark Saltzman is Goizueta Foundation Professor of Chemical and Biomedical Engineering at Yale University.*

## Imagine the Unimaginable

By Laura A. Carroll-Koch

Imagine your fourth graders speaking about the DNA molecule, its organization, purpose, and potential. Imagine your students fluent enough in the language of science to begin discussing ways in which the DNA molecule could be restructured, reorganized, transported, and integrated into a cell system. Imagine your students creating simulations that geneti-

*Laura A. Carroll-Koch is a Fourth-Grade Teacher at John S. Martinez School in New Haven, Connecticut.*

hope that the defective genes can be replaced with new functional genes, which will cure the disease.

Since the discovery of recombinant DNA technology in the 1970s, our society has quickly gained the capability to manipulate and use DNA as a tool for understanding and treating disease. DNA technology has also changed the way that we manufacture drugs. Human genes can now be inserted safely and efficiently into bacteria, yeast, viruses, or animal cells. This capability has already led to the production of recombinant proteins as therapeutic drugs; diabetics around the world now use recombinant human insulin that is safe and inexpensive. DNA technology is also changing forensic science, agriculture, and other aspects of contemporary life. Some bioengineers are even learning how to use DNA as a tool, deploying DNA molecules as molecular Tinker Toys for building tiny but well-defined objects, not unlike the models of DNA that Laura builds with her students.

Laura and the other Fellows examined nucleic acids, beginning with an introduction to the science of genetics and ending with descriptions of some of the ways that DNA is now used in human health. Along the path from genetics to bioengineering, the seminar focused on the structure of nucleic acids and the basic concepts

cally engineer therapies for diseases; creating seeds that may one day be the basis of cures for cancer. Imagine the unimaginable. Harness your students' potential with the power of DNA and genetic engineering knowledge.

My intent and purpose in writing this unit was to give teachers a way to teach students the framework from which to begin thinking about genetic engineering at its very root, DNA. My belief is that young students are capable of understanding the complex concepts of genetic engineering when the concepts are broken down into

underlying molecular biology. The seminar also made excursions into the field of biotechnology, which harnesses what we know about DNA to manufacture new medicines, to improve foods, and to treat diseases where medicines fail. The discussions in the seminar were enhanced by our reading from: *Introduction to Genetic Engineering, Third Edition*, D.S.T. Nicholl, Cambridge University Press (2008); and *Biomedical Engineering*, W. Mark Saltzman, Cambridge University Press (2009).

Laura prepared a curriculum unit called "Harnessing the Power of DNA," which was designed for elementary school teachers and students. Her unit provides a description of the basic science of DNA and molecular biology, including a presentation of ways to use this information to treat diseases that have proven very difficult to treat. In her curriculum unit, Laura brings to the foreground a theme that is present in all of the units produced by Fellows in this seminar: teachers can generate excitement in their classrooms by exposing their students to new concepts in genetics and genetic engineering, with the hope that many young people will be inspired to careers in science, to help realize the potential for science and engineering to improve the lives of the world population.

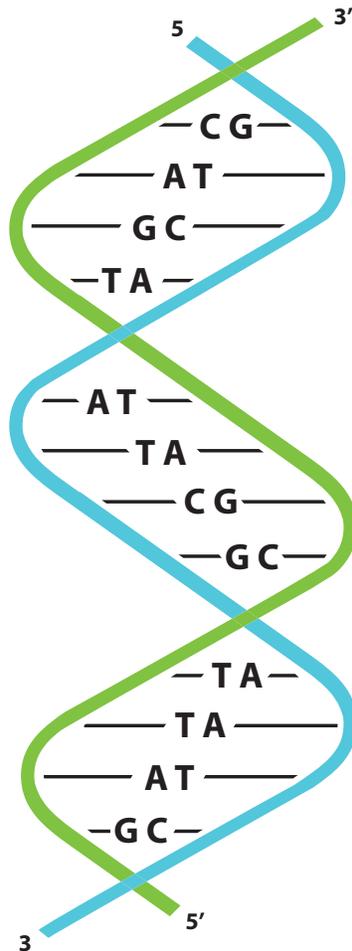
small enough pieces and presented through concrete activities.

I began the unit on genetic engineering by teaching my students how to make a DNA molecule out of licorice and gummy bears. Wide-eyed and eager, they hung on my every word as I explained that DNA is the blueprint of life itself. It is the recipe that makes your arms, legs, brain, eyes, and all the parts of your body now and in the future. This recipe also tells your cells what to become, how to work, and when to grow. This extraordinary recipe, I explained, is in the nucleus of every single

cell of your body! Surprisingly, this recipe has only four main ingredients, I explained further, and they pair together; Adenine with thymine, and guanine with cytosine. After I illustrated the DNA molecule on the board and explained the base pairings, students excitedly began to build their DNA molecule. They quickly and easily matched and color coded the gummy bears representing the base pairing; orange-guanine, yellow-cytosine, red-adenine, green-thymine. Students excitedly built their DNA molecules with the licorice and gummy bears, while enjoying an occasional snack. I watched as students referred to the board to confirm their base pairings, whispering their matches, "thymine and adenine, apples in a tree, and cytosine and guanine, cars in the garage." After students matched the complementary bases, they connected their gummy bear base pairs to the licorice with toothpicks, which resulted in a concrete representation of the DNA ladder. I watched broad smiles of pride spread across their faces as students gently lifted the DNA ladder, carefully twisting it to form the familiar double helix. Finally, students drew their creation in their science notebook, color coding the base pairs and labeling the parts of the DNA molecule.

After they had built the candy model, I wanted my students to see real DNA with their own eyes. So, I taught my students to extract DNA from strawberries. I began this activity with a demonstration of the procedure and then grouped students by fours to try it on their own. Students began by putting the fruit in a ziplock bag and enthusiastically smashing it, in order to break down the cell walls. Next, they added water and a bit of detergent to open the nucleus membrane, releasing the DNA into the cell gut soup. After they strained the mixture through a coffee filter, I went to each group to gently pour rubbing alcohol onto the surface of their mixture. We set the beaker on the table. All eyes were table level, staring at the mixture, quietly waiting, "There it is! I see it!" Nicole shouted with excitement, as she pointed to

the beaker. Students watched mesmerized as strings of DNA began to rise through the alcohol to the surface of the mixture. After a few minutes, students saw the DNA make a slimy, white cloud on the surface of the mixture. They took turns lifting the DNA and touching it. They described the DNA as "snot" beneath giggles. This concrete, hands on activity not only furthered their



STRUCTURE OF DNA DOUBLE HELIX, 2015

understanding, it brought their knowledge to life.

Next, giving a broader context to the DNA molecule, students learned about the cell, its organelles, and their functions. Since the language of the cell was challenging, we made flashcards, played games, wrote songs, drew pictures (adding labels with captions), wrote essays, and

created analogies until the words flowed from their lips like water through a faucet. In a cell celebration, students made cell models and presented them to the class, explaining each organelle and its function. Fluency around the subject took root as students proudly presented their cell models to the class.

Building upon cell knowledge, students learned how DNA makes proteins through a simulation activity on transcription and translation. First, students made a large cell on chart paper, utilizing construction paper to form the DNA molecules in the nucleus. Then they cut open the DNA molecule with scissors, thus simulating the Helicase enzyme which opens the double helix. Next, students matched up a yellow piece of construction paper to the open DNA, transcribing the code to construct the messenger RNA (mRNA); this time pairing Adenine to Uracil and C to G. Then students moved the mRNA out of the nucleus into the ribosome factory. As a part of this simulation, we made ribosome factories with blue construction paper. Two vertical slits allowed the mRNA to be woven through the ribosome. The yellow construction paper mRNA was folded by 3's to mark every codon. As the mRNA moved through the "factory," each codon was translated into an amino acid. Finally, students threaded a colored bead, representing an amino acid, onto a string when each codon was "read" by the ribosome. In the end, students watched a beautiful string of beads grow, representing the protein that was made from the DNA code, after it was transcribed and then translated. Students proudly wore their protein bracelets for days.

Understanding the process of transcription and translation, students could then understand diseases as broken DNA code. Our focus could now turn to correcting broken code. During this part of the unit, students created an engineering "tool kit," filled with corrective possibilities. I asked them to use their imaginations and

*(continued on page 33)*

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# Energy Sciences

By Gary W. Brudvig

With concerns about the impact on the environment of our current use of fossil fuels and our national energy security, energy is in the news on a daily basis. Many students have seen Al Gore's movie "An Inconvenient Truth" and are familiar with some of the issues relating to energy use, but they may not know much about the science related to energy. The aim for this seminar was to discuss the science related to current sources of energy and potential future sources of energy. We can learn much about sustainable energy use by studying natural processes. Nature has solved the renewable energy problem through the process of photosynthesis that is carried out by green plants. Green plants are amazing chemical factories and provide a working example of renewable solar energy conversion, but this is often not appreciated. By understanding how green plants carry out the processes of solar energy utilization, we can obtain some answers to the question of how we can harvest solar energy by using processes of artificial photosynthesis.

When I was a child, my own hands-on experiences with science and nature left the greatest impressions and fueled my desire to learn more. Therefore, many demonstrations were included in this seminar — at least one demonstration, and frequently 2-3, in each seminar meeting. These demon-

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*Gary W. Brudvig is Benjamin Silliman Professor of Chemistry and Professor of Molecular Biophysics and Biochemistry at Yale University.*

## Gasoline or Biodiesel?

By Jinsue C. Hafalia

"I love chemistry" is not a phrase that many chemistry teachers hear from their students. Atoms and mole-

strations were chosen so that they could actively involve the participants and at the same time illustrate the scientific principles related to energy.

The books by David Walker entitled *Energy, Plants and Man* and by David J. C. MacKay entitled *Sustainable Energy — without the hot air* were used as the primary technical books for the seminar. We also read Daniel Yergin's *The Quest: Energy, Security and the Remaking of the*

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The Fellows prepared an outstanding collection of curriculum units that include a number of excellent activities that will engage the students' interest and teach them about Energy Sciences.

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*Modern World*, a fascinating but not highly technical analysis of our current energy use. The beginning of the seminar focused on energy, light and photosynthesis. The seminar began with a discussion of how green plants use light to convert carbon dioxide and water into sugar and oxygen gas. This included discussions on the nature of light and the fundamental steps by which light is absorbed by green plants and converted into chemical energy. Demonstrations of the colors in light using

diffraction glasses aided these discussions. A connection was made between natural photosynthesis and the excess production of biomass that has been buried to form the "fossil fuels" that provide most of our current energy. Next, we delved into various forms of energy, including hydroelectric, biofuels, wind, geothermal, solar and nuclear. A particularly memorable experience was the production of biodiesel fuel from cooking oil and its combustion in an oil furnace burner. The seminar also included a discussion of energy use in the future that included progress in development of systems for artificial photosynthesis and fuel cells.

At the end of the seminar, the Fellows prepared an outstanding collection of curriculum units that include a number of excellent activities that will engage the students' interest and teach them about Energy Sciences. Information on the responsible use of current sources of energy to lower our carbon footprint, as well as the impact of our energy use on our planet Earth, is provided in many of the curriculum units. A particularly innovative unit was prepared by Jinsue Hafalia, entitled "A Chemistry Perspective: Gasoline or Biodiesel?". As described in the following article, Ms. Hafalia compares current sources of energy based on fossil fuels with the renewable energy source provided by biodiesel. I would encourage all teachers of elementary through high school students to review the curriculum units prepared during the Energy Sciences seminar. These materials provide a valuable resource for incorporating topics of science and society related to "Energy Sciences" into the classroom.

cules are mysterious things to many students and even adults. The idea that everything in this world is composed of matter made by the rearrangements of atoms into molecules is a very strange

concept to understand. The great struggle of chemistry teachers is to help students make relevant connections of these things called "atoms" to the world that the students live in.

Through Gary Brudvig's seminar on "Energy Sciences," teachers were able to create relevant and engaging curriculum units to bring back to the classroom. During these seminars, I learned about the energy crisis not only from a scientific perspective but also from a political and economic perspective as well. It was eye opening to see the complexity of this global issue. During the two weeks of the seminar, Gary also taught us about current research that is being done to find alternative sources of efficient, renewable energy right on the Yale campus.

The unit that I came up with focused specifically on comparing gasoline with biodiesel in hopes that students could relate through their experience of riding in cars and buses for transportation. I wanted to focus on energy sources that could be described using chemical formulas rather than other sources of energy such as wind power. The unit was spread throughout the year and revisited whenever the different topics covered in class made it relevant to bring in the ideas of heat or chemical reactions. Students were first introduced to gasoline and biodiesel when the class learned about combustion reactions. Then we revisited that pair during balancing equations, taking a pause to understand the carbon dioxide output for these two sources of energy. Finally, the class looked at the two fuel types when they were learning about stoichiometry and mass-to-mass relationships between reactants and products.

The purpose of incorporating the fuel sources throughout the year was to prepare the students for their culminating project, which was a presentation in which students promote one type of energy source that they believe is best fit for their community. I decided to review on this occasion the running theme throughout the year and repeat some of the activities of the unit in succession so that stu-

*Jinsue C. Hafalia is a Science Teacher at Yerba Buena High School in San José, California.*



EDWARD RUSCHA, STANDARD STATION, AMARILLO, TEXAS, 1963

dents could have a better understanding of how they had been looking at the topic of energy all throughout the year. I also incorporated articles about the energy crisis, the consequences of using too much fossil fuel, and alternative energy sources to introduce students to the crisis posed by our society's current energy usage. This was the jumping off point for students to begin their own research.

Looking back on the execution of the unit, I realized that students generally did well when we discussed gasoline and biodiesel within the topics covered throughout the year. The difficulty came, however, when they tried to piece the information together to look at the bigger picture of the energy issue. As we began the culminating project, I could see that students were struggling to understand the complexity of the issue, and even in the end, I am not sure many of them truly understand that the gravity of the impact that irresponsible use of fossil fuels has on the environment. Nevertheless, I believe that their interests were piqued, and I hope that these very students will become agents of change in the future.

In addition, the unit helped me to recognize the importance of incorporating more reading and writing in science. Science articles use a very different style of writ-

ing from what students read in their English classes. Students had a hard time following the flow of some articles' logic and deciphering research-supported fact versus opinion. As students began reading the articles that I had assigned to them, I immediately realized that I needed to support the articles with a lot more scaffolding, so that students could follow the argument. Especially with the shift to Common Core, I learned that I need to expose students more to scientific writings and help them analyze the information they read.

Through teaching my curriculum unit, I saw that bringing current events with no clear answers into the classroom not only sparked the interest of students but also helped them to see how they could perhaps one day help find a solution. The Yale National Initiative stretched me as a teacher by providing me with confidence in my knowledge of the subject to bring back the information to the classroom. Gary's seminar and being surrounded by like-minded teachers from all over the country helped renew my passion for teaching and creating new curriculum. I am truly grateful for the opportunity to participate in the Initiative and hope to continue to modify and improve my unit every year.

# Place Value, Fractions, and Algebra: Improving Content Learning through the Practice Standards

By Roger E. Howe

The seminar on "Place Value, Fractions, and Algebra: Improving Content Learning through the Practice Standards" took its inspiration from the Practice Standards of the Common Core State Standards for Mathematics (CCSSM), which were developed in 2009-11, and have been adopted by the large majority of states. The Practice Standards are eight in number:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

The seminar took the point of view that these standards are not to be taught directly. Rather, they are habits that develop over time when students experience good teaching of challenging material. They can be pointed out explicitly when students have experienced enough examples. Accordingly, the Fellows of the seminar concentrated on writing units that implicitly embody the Practice Standards by giving coherent and connected views of important topics of the mathematics curriculum, built around collections of challenging problems.

The main topics of the units were diverse. Several dealt with fractions, one with place value, some with algebra, and one with functions. I was delighted that Anne Agostinelli decided to write a unit centered on expressions, because this is a perennial problem topic in the curriculum, and one to which I have devoted considerable thought.

For dealing with expressions, I advocate regarding them as recipes for computation. The various operations symbols in expres-

*Roger E. Howe is William R. Kenan Jr. Professor of Mathematics at Yale University.*

sions function as instructions. Thus  $2 \times 3 + 8$  says, "Multiply 3 by 2, and add 8 to the result." On the other hand,  $2 + 3 \times 8$  says, "Add 2 to the product of 3 and 8." When variables are involved, the instructions include "Pick a number." This applies each time a variable first appears in an expression. Thus  $x - 2$  says, "Pick a number  $x$ , and subtract 2 from it." Learning to read expressions correctly is like learning specialized terminology in any subject. It requires a lot of practice, and mastery of the vocabulary and the grammar.

Anne Agostinelli took these simple principles and skillfully wove them into activities that developed a classroom culture of collaboration, discovery and steady improvement. Her students responded. The idea that "Algebra is delicious," is one I will savor for a long time.

Fractions was one of the topics especially mentioned in the somewhat unwieldy seminar title, and for good reasons. One is, fractions have been one of the topics with which U.S. mathematics instruction has been least successful. A second is, that the Common Core has adopted a new and potentially more promising approach to fractions, by starting with the idea of a unit fraction. In particular, this approach gives students a better chance of revising their understanding of the idea of number, so that they can come to think of fractions and whole numbers as being on an equal footing. Unit fractions are fractions with 1 in the numerator:  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ , etc. A unit fraction, say  $\frac{1}{4}$ , of some quantity, is another quantity, of which it takes 4 copies to make the original quantity. So,  $\frac{1}{4}$  of a foot would be 3 inches;  $\frac{1}{4}$  of an hour would be 15 minutes;  $\frac{1}{4}$  of a quart would be one cup. This approach gets students thinking of fractions as numbers that express quantity relationships, rather than "so many out of so many," an approach that leaves many not even thinking of fractions as numbers, but as two juxtaposed numbers.

Three of the units deal with fractions. All use the approach through unit fractions,

and make substantial use of two models for fractions that were discussed in the seminar: number line models and area (aka "cornbread" or "brownie pan") models.

Josephine Carreno develops her unit for fourth graders who are still getting used to fractions, and presents them with many different models. Patricia Lee's unit is for fifth graders who will need to study fractions intensively to stay in the hunt with mathematics. She emphasizes the number line because it is a comprehensive model that is especially good at conveying the idea that fractions belong to one overall system, and that any two of them can be compared for size. Rajendra Jaini's unit is for his chemistry students who need to increase their facility with fractions in order to deal with stoichiometry and other aspects of chemistry.

The topic of place value is represented by Torrieann Kennedy's unit for her second grade class. She emphasizes role of the base ten units (1, 10, 100) in expressing 2- and 3-digit numbers and in addition and subtraction. Anne Agostinelli and Marissa Brown have produced units dealing with algebra. Anne's unit focuses on introducing symbolic expressions in ways that help students make sense out of the new language known as algebra. Marissa's unit is built around understanding linear functions from multiple points of view — from real-world contexts or scenarios, from tables, from graphs, and from symbolic equations. Key to connecting tables with graphs is the idea of rate of change, and its geometric analog, slope. A major take-away for her students is that an algebraic relationship is linear if and only if the associated function has constant rate of change if and only if the associated graph is a straight line.

Finally, Nancy Rudolph's unit stretches the boundaries of the seminar. She has written a unit to help her pre-calculus student better grasp the idea of inverse function. In so doing, she must sharpen their understanding of the formal structure of functions.

# Building Fearlessness in Middle-School Problem Solvers

By Anne E. Agostinelli

The Common Core State Standards (CCSS) have been the topic of much media coverage. Mainly, the impacts being discussed are the ones on teachers who are revamping their curricula and parents who can no longer help their children with homework, particularly in mathematics. However, the student experience is changing as well, and this change is overdue, given the huge advances in technology and a job market that is ever-changing. Gone are the days of the college and vocational tracks; we are now preparing students for jobs that do not even exist at this time.

Middle-school students are especially impacted by the shifts in the CCSS in math. They come with gaps in content knowledge of important topics that have been relocated to lower grades, such as linear algebra and depth in ratio and proportion. For students who have not had much success in math over the years, this can potentially be crushing to both their spirits and their learning. So what is a teacher to do?

One of my favorite features of the CCSS-M is the Standards for Mathematical Practice, describing the habits of effective mathematicians. They include the "soft skills" of learning and doing mathematics, like persevering through problems, attending to precision, and finding and making use of structure in problems.

I recognized that many of my students had decided long ago that they either were "good" or "bad" at math. As someone who fell completely out of love with math during freshman year Geometry, I could relate to both feelings. Having also fallen back into love with math years later through the guidance of an amazing professor, I also knew that neither self-diagnosis is a final verdict on one's experiences and abilities in mathematics.

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*Anne E. Agostinelli is a Mathematics Teacher at Lyman A. Budlong Elementary School in Chicago, Illinois.*



JACOB LAWRENCE, *THE MIGRATION OF THE NEGRO*, PANEL NO. 58, 1940-41

My students started our year solving problems together and doing a lot of oral and written reflection on how their strategies and working together helped them to arrive at "Aha's," which we put more value on than actual solutions. The problems we worked with our first week were inspired by movies, like "Die Hard" (how can we get this water evenly distributed before a bomb goes off?), and Dan Meyer's "Three Acts" (what do we do when we add too much chocolate to Nana's milk without starting over?), and visual patterns representing linear and exponential relationships.

What was the key to problem selection? No particular prior mathematical knowledge was necessary to be able to attack the problems. Of course there were methods more efficient than others, but very few groups had that content knowledge yet and hardly anyone fully solved any of the problems. But that was not the point.

During this first week, we also focused on defining and developing growth mindsets in mathematics. We first had to believe that we could do it before actually doing much. It was a success. We watched videos on neuroscience, reflected together and in writing about the value of effort and chal-

lenging ourselves in brain development, and the gifts that making mistakes provide to our learning. Students were willing to attempt challenging problems, and that was a huge obstacle overcome that set the foundation for learning that we needed.

Once we had begun to build our classroom culture, students dove into the CCSS-M with mostly open minds. The unit on expressions and equations I developed during the seminar had been carefully sequenced through the guidance of Roger Howe. His deep understanding of the content progressions helped me navigate the gaps that our K-12 implementation of the standards had created.

Students were engaged in problem sets that scaffolded their understanding of ideas through the content sequence of the unit.

The contrast between the first five weeks of my algebra classes last year and this year is stark. The time taken on setting a culture of learning as well as the logical sequence of lessons and focused problem sets in the unit are the reasons why. My students are excited about math and believe they can do it. As one of my students remarked in an interview after the unit, "Algebra is delicious!"

I could not agree more.

# Immigration and Migration and the Making of a Modern American City

By Mary T. Y. Lui

*Editor's Note:* Lawrence's *Migration Series*, which so aptly illustrates the theme of Mary Lui's seminar, may seem simply to focus on the hopes that accompanied the exodus from the South during the Jim Crow era. But Lawrence is prescient: there is hope, but there is a sense of solitude in the series, despite the grouping of figures. As Isabel Wilkerson points out in a *New York Times* review of the MoMA exhibition catalog, Lawrence sometimes represents a boy standing apart: quizzically observing the consequences of his parents' migration. One of the destinations in our image is St. Louis, reminding us that despite progress, the life of a displaced person is always hard, and that we are still in the age of Ferguson.

In 2014, I led the seminar titled "Immigration and Migration and the Making of a Modern American City," that used the histories of New York, Chicago, and Los Angeles to examine the overlapping histories of migration and settlement in U. S. urban formation in the last two centuries. The seminar challenged participants to see American cities as spaces of encounter where longtime residents and newcomers engaged in a broad range of social interactions. Historic contestations and collaborations over work, housing, and leisure as well as personal and collective efforts toward self-determination, social legitimacy, and political power came to life through a wide range of primary sources: autobiography, literary fiction, census, photography, painting, film, newspaper articles, cartoons, and maps.

The teachers participating in the seminar experienced the impact of immigration and migration first-hand through their daily contact with the diverse student bodies and communities where they live and teach. As a result, the teachers readily connected their students' lives and struggles to our seminar readings and discussions and found inspira-

*Mary T. Y. Lui is Professor of American Studies and of History at Yale University*



JACOB LAWRENCE, *THE MIGRATION OF THE NEGRO*, PANEL NO. 1, 1940-41

tion in the course's rich and powerful primary texts such as Harriet Jacobs's *Incidents in the Life of a Slave Girl* or Stephen Crane's *Maggie: Girl of the Streets*. Over the course of the seminar, the teachers developed strategies for using primary texts as doorways for helping their students enter into the urban past and engage deeply with the social and economic struggles of

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**The teachers experienced the impact of immigration and migration first-hand through their daily contact with the diverse student bodies and communities where they live and teach.**

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European immigrants, African Americans, Latino Americans, and Asian Americans.

Krista Waldron from Tulsa, Oklahoma saw in many of our primary source readings vivid descriptions of "rites of passage" experienced by urban youth across time. Engaging in a fight to claim territory and establish a sense of belonging or finding a

job to secure food and shelter were all scenes that would be familiar to her students and allow for meaningful connections to the lives of earlier immigrants and migrants. Krista shared with the seminar the challenges faced by her students — extremely at-risk youth — who did not have a history of academic success and often felt alienated by the public education system. Krista's passion and strong faith in her students led her to develop a unit that would validate their struggles while helping them see their own lives and choices through a critical social lens.

Krista's unit, focused on urban youths' "rites of passage" stories, brings her students into deep engagement with the past and allows them to consider the power of writing as social critique. The authors chosen for her unit — Jacob Riis, Richard Wright, Piri Thomas, Stephen Crane, and others — all turned to the pen to voice their concerns with urban life and expected their writing to move their readers and stimulate social change. Krista's creative use of these writings aims to foster critical readers, thinkers, and writers. Armed with the tools of historical inquiry and writing, they will be empowered to narrate and comment on their own lives and communities.

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# Students Narrate Their Rites of Passage

By Krista B. Waldron

"There is no agony like bearing an untold story inside you."

—Zora Neale Hurston

I discovered this sentence of Hurston's while reading for my first Yale National Initiative unit three years ago, and I kept hearing its echo while working on my most recent one. Two notions stand out to me upon the completion of my third year writing curriculum as a Fellow. First, the power of narrative is strong with young and maybe damaged writers. Second, careful attention to appropriate practice and text-selection for at-risk students can make or break the execution of a unit. After a decade of teaching English in an AP- and IB-driven magnet school, I've spent my last twelve years in alternative schools. Three years ago, coinciding with my first year as a Fellow, I decided I wanted to move to what is inarguably the school with the students most at-risk, a partnership between the public school system and our juvenile justice bureau. The three things my students are most likely to have in common are chronic poverty, lack of previous academic success, and a history of trauma. I knew the unit I would write would have to accommodate students who were reluctant, afraid, frustrated, and challenged by life. The research I did that summer changed some of how I teach literature and writing to at-risk students, and it has shaped my planning and teaching since. The products of my unit, "The Settled and the Unsettled, Then and Now: Rites of Passage in Urban Life and Narrative," from Mary Lui's seminar, "Immigration and Migration and the Making of a Modern American City," reflect both Hurston's quotation and lessons I've learned as a Fellow in the Initiative.

My students were no strangers to writing personal narratives from a variety of

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*Krista B. Waldron is an English Teacher at Phoenix Rising Alternative School in Tulsa, Oklahoma.*

prompts and of varying quality in their careers as students; indeed, I'm sure I have assigned too much of it over the years, knowing that it was a form of prose my more reluctant writers would reliably produce, though often uninspired. I knew that as an English teacher I could potentially make a mess of lessons on immigration and migration. I needed a theme to which my students would respond to sustain momentum, and I settled on the universal theme of rites of passage.

Moving out on my own.

Getting arrested.

Getting off probation.

Attempting suicide.

My first fight.

Getting saved.

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A classroom for  
at-risk students  
can be the crucible in  
which they can  
unburden themselves  
with their stories.

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I have photographs of my students standing at the front of the room, holding signs that share their own rites of passage, including those above. Among other activities, in class we read research on what happens to young people who don't have enough socially sanctioned growing-up rituals. We studied images by Jacob Riis of immigrants in New York City's Five Points neighborhood at the end of the 19th century. They learned sophisticated annotation techniques while they read part of Steven Crane's *Maggie: A Girl of the Streets*, a text I wasn't sure some of my students would read — much less enjoy — even though it met criteria for selecting texts for at-risk teens. Somehow they understood that the work they were doing was different, and the work that I'd done to prepare them was different — richer,

more responsive, and more careful and practiced. When the stories came, they were real, raw, and driven by deep motivation. To do justice to their stories, they found greater value in lessons they'd had about using concrete language. Some also took their self-evaluation on their writing trackers more seriously.

These are the opening sentences from a 14 year old's narrative: "I remember going to JBDC and getting locked up. When I got to the back they made me take off my clothes and get in the shower but only for 5 minutes. They only let me sleep in a long t-shirt and socks and that's it. It is always cold in the jail cells. And all they give you to sleep with is a cot and a blanket."

With their less-than-perfect attendance and our high student turnover rate, not all students completed and polished a rite of passage story. But they all had stories to tell. This is from a first draft, including original errors: "i heard footsteps, fast pace ones, close ones, angry ones. I also heard a clutching sound, the sound of a gun simply putting a bullet in the head, i turned to see if i was hearing what i was really hearing. The only thing my eyes seen was a gun being pointed our way, i began to run and warn my older brother. They began to let loose fire, by the grace of God i made it to the car and got in. BANG! the back window was gone. My brother began to drive and yelling at me instructing me to get down and stay down, thats what i did. I began to cry and pray to God that we make it home safely..."

What made their work on these stories so urgent? I believe that it all goes back to the two key lessons I've internalized in my time as a Fellow — that a classroom for at-risk students can be the crucible in which they can unburden themselves with their stories, and that teachers can provide that through exposure to literature and informed writing instruction. Zora Neale Hurston was correct; my students did have stories burning to be told. The telling was indeed therapeutic, and the tellers were proud.

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# Understanding History and Society through Images, 1776-1914

By Timothy J. Barringer

The seminar on "Understanding History and Society through Visual Art, 1776-1914" brought together a group of teachers from across the country whose mutual interest lay in finding vivid new ways to engage students with the past. We live in an ever-more visual society, and the interface between young people and the world around them tends now to be the computer screen rather than the printed word. Indeed, students of all ages have a multitude of imagery at their fingertips; internet sources have democratized access to fine art and documentary materials as never before. As a professor of the History of Art, I learned a great deal from discussing this new world of visuality with a group of teachers whose students range from second to twelfth grades.

The Fellows, then, set out to explore at methods for understanding culture and society through art. The seminar proceeded historically, and was focused on the "long" nineteenth century, from the American Revolution to World War I, 1776-1914. A major focus lay in the development of verbal skills in the description and critical analysis of images — not through the use of art history jargon, but through close looking, visual and contextual analysis. We worked together to discover and refine ways in which the analysis of works of art can enable students, from kindergarten to twelfth grade, to understand history and make a more direct

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*Timothy J. Barringer is Paul Mellon Professor of the History of Art at Yale University.*

## The World Needs More Critics

By W. Miles Greene

"Mr. Greene, is this some sort of joke? This lesson is about *art-work*!" said one of my more

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*W. Miles Greene is an English and History Teacher at Emery Secondary School in Oakland, California.*

connection with the experience of historical individuals. Moving beyond the use of works of art as historical documents, we discussed the ways in which engagement with an image, as with a story or novel, can encourage empathy and access to the experience of people with different cultural, ethnic or economic backgrounds.

As important for the seminar as the development of critical skills for analysis digitally transmitted images was a return to direct, unmediated encounters with the historical object — real things, from tiny objects in a museum case to streets of buildings replete with historical resonance.

Rodney Robinson's curriculum unit utilized the rich material survival of nineteenth-century buildings in Richmond, Virginia, to engage with the history of slavery and its legacies in the community. Visiting sites within a few blocks of his school, Rodney is able to confront the physical remains of the system that condemned African Americans to a state of "social death." There could be few more vivid uses of the historical fabric of a townscape. Even where the actual structures have been demolished their memory remains, Rodney and his students aimed to explore the historical echoes of the slave market and the machinery of repression that dominated the life of Richmond's African American population until the Civil War. The class also provided a space for the celebration of African American achievement in Richmond, both during slavery and, most importantly, since the end of that dark chapter in American history.

"energetic" tenth grade World History students.

The projector illuminated my unit title, "Power and the Machine: A Visual Examination of Class and Gender through the Industrial Revolution," in front of Thomas Allom's evocative 1835 piece, *Powerloom Weaving*.

Miles Greene, in California's Bay Area, turned his attention to the Industrial Revolution, perhaps the greatest transformative series of events in modern history across the globe. Important though it is, the Industrial Revolution is a complex phenomenon not easily grasped by children who have never known a non-mechanized, non-computerized world. Miles' curriculum unit notes that the Industrial Revolution "acted as a major transitional force that resulted in the advent of cities, factories, urbanization, and new structuring around labor, class and power," and uses visual representations made in Britain and America, as well as textual primary sources, to dramatize these tremendous changes in social life, ecology and economic structures. Miles used the new accessibility of images to create a rich visual archive of industrialization. He also introduced new modes of engaging with the visual image including a "silent gallery" of contemplation of works of art, an attempt to slow the students down and help them to focus in depth. This pensive moment was followed by an act of writing: students produced "90-word descriptions" of each piece in the style of a museum label.

In combination, digital images and actual survivals of the historical past can provide students with a powerful experience of history, and through it, deeper insights into the world of present-day America. The units in "Understanding History and Society through Visual Art, 1776-1914" certainly opened my eyes to the possibilities for innovative teaching of history both within and beyond the classroom.

I didn't want to stifle my students' potential excitement over the unit by footnoting the half-dozen primary texts they would be examining in the next three weeks, so I went along with the sarcasm. "Yes, as it says in the title, we will examine artwork to learn what life was like for workers during the Industrial Revolution." The fact that my

introduction to this new unit was met with one part mystification and two parts relief showed that I was off to a good start.

In the summer of 2014 I developed this unit while participating in the Yale National Initiative, not only to help students master the social and political aspects of the Industrial Revolution but to help them make inferences, corroborate facts and understand that visual images are a vehicle for historical storytelling, a political snapshot of the time in which they were created. Like any teacher of social studies, I want my students to become better historians. But such a challenging goal requires a creative strategy.

Back in the classroom after my summer seminar, I asked my students the same seemingly unpromising question my seminar leader Tim Barringer had asked us: "What's going on in this picture?" the room was uncomfortably silent, but I understood that although it produced awkward lulls and unhelpful remarks at times, this question was a strategy central to my unit, "Questioning Artwork."

The philosophy behind Questioning Artwork was similar to one of those cruise ship ads, "It's not the destination, it's the journey that counts." I wanted my students to wrestle with the painting's message and intention — not so much to "get it right" as to "work it out." In this case, students were looking at Joseph Wright of Derby's *An Iron Forge* (1772). By asking the right questions about the painting (and dedicating much of the class period to it), students eventually found significance in themes like authoritative relationships, family lineage, privilege and pride. By examining things like clothing, lighting and body language, students were able to develop claims about a piece, its message and its maker, essentially becoming art critics in their own right.

This strategy was messy at times, and often required redirection, but it was a journey that was fun and leveled the playing field for my weaker learners. Although the unit featured the critical analysis of art, I integrated a number of primary documents



WINSLOW HOMER, OLD MILL (THE MORNING BELL), 1871

that complemented the immersion in artwork. I used a method discovered in my research at Yale called the 4-Reads strategy, authored by Bayard Faithful of TeachingHistory.org, which teaches students to read primary documents with four objectives: context, meaning, argument and synthesis. Thus a non-visual learning process also took place, as students examined complex primary sources about shocking conditions.

Some student focuses emerged. They were disgusted by the dreadful living conditions of sanitation workers in the newly formed urban centers, illustrated in *Chadwick's Report on Sanitary Conditions*. There was outrage at the degradation and inconsistent treatment of women described in an excerpt from Harriet Robinson, *Harriet Robinson: Lowell Mill Girls. The Life of the Industrial Worker in Nineteenth-Century England* resonated with students the most, as it outlined a number of interviews with Michael Sadler, an English Parliamentary investigator who was tasked with interviewing child workers about their experiences in the factories during the early 19th century. Students were split into groups, with each group responsible for examining one of the dozen interviews sup-

plied by this document. They were hooked; they soaked up the content like a sponge and were able to make accurate generalizations about the life of teenagers working in the dark, damp and totalitarian environment that was the industrial workplace in England during the 19th century.

Fast forwarding two weeks and a handful of activities later, students were given their final assessment: choosing their own piece of artwork to analyze in front of their peers in addition to writing a mock primary source fictitiously authored by one of the characters in that piece. At this point they enjoyed both the responsibility and open-ended creativity given to them by their teacher. The final products were both entertaining and indicative of how much they had learned using such rich and, at times, dense content.

One student summarized his experience by saying, "I enjoyed how we were able to step into the painter's mind and also really understand what the [primary source authors] were thinking when they were at work." Although putting my unit to work came with its fair share of glitches, I am happy knowing that for many students, my work helped them become strong art critics, and even stronger historians.

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## Pain to Pride:

# How Can the Pain of the Past Generate Hope for the Future?

By Rodney Robinson

I participated in Tim Barringer's seminar on "Understanding History and Society through Visual Art, 1776-1914". In this seminar, we analyzed some of the greatest artwork in history. Tim taught us multiple techniques to analyze art and images, and with the help of these tools I created various graphic organizers for my students to use in analyzing images and artwork from United States History.

The main focus of my unit was on the slave trade in Richmond, Virginia. When we started the unit, my lesson plan was to have the students write the story of slavery through images, using the graphic organizers. Students examined several famous pictures such as JMW Turner's *The Slave Ship*, originally known as *Slavers Throwing overboard the Dead and Dying — Typhoon coming on*, and James Gillray's *Barbarities in the West Indies*.

At first, my students struggled because this was a new experience. The graphic organizers were too complex and they became extremely frustrated. I had to take a step back and reorganize. I adjusted the difficulty of the graphic organizers and began to scaffold my students' art skills. After a month of building their skills, I then reassigned the story of slavery. The students felt more comfortable and wrote great essays explaining the voyage of slavery to the new world as they understood it by using only images as their primary source or rationale for their essay.

The focus of the class then turned to the slave trade in Richmond, Virginia and Lumpkin's Jailhouse, which was the second busiest slave trading house in the South during the early years of America. Today, it is an empty parking lot running beneath Interstate 95. It has been the source of major controversy because urban developers, supported by the

*Rodney Robinson is a History Teacher at Armstrong High School in Richmond, Virginia.*



EYRE CROWE, SLAVES WAITING FOR SALE: RICHMOND, VIRGINIA, 1852-53

mayor, want to build a baseball stadium on the land, completely neglecting the history that surrounds it. It was the perfect teachable moment for my students because neighborhood groups had been protesting. The students wanted to understand the uproar in their neighborhood.

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**Lumpkin's Jailhouse was the second busiest slave trading house in the South. Today, it is an empty parking lot, the source of major controversy.**

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The students then analyzed the famous sketch *Slaves Waiting for Sale*, by Eyre Crowe. The sketch was made at Lumpkin's Jail in 1853. The students analyzed this sketch on a field trip to the site (which as I say was an empty parking lot). I also read passages from Solomon Northrup's *12 Years a Slave*, local histori-

an Charles Corey's 1895 book about Richmond's *Colored History*, and from W.L. Bost's *Unchained Memories: Slave Narratives* while the students were analyzing the picture to enhance their experience. The passages allowed the students to develop deeper understanding by exposing them to multiple perspectives on the Lumpkin's Jail site.

After the trip my students wrote impassioned essays explaining why the slave site should be preserved and sent those essays to the mayor. Several students attended local protests against the proposed new ballpark and met a living ancestor of Solomon Northrup.

I felt so much pride in my students because they started out the lesson frustrated and bewildered but ended up becoming politically active. Eventually, the urban developers backed off the plan of a proposed baseball stadium, but an empty parking lot still sits on the Lumpkin's Jail site. The next step is for the students to show their pride in their neighborhood and organize support for a museum or permanent monument to recognize one of the most historic sites in the country.

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## Lee: Philadelphia

(continued from page 8)

connections have encouraged collaboration among teachers on projects and activities, and in conferences and programs, within and also beyond their respective classrooms and schools.

Participants report tremendous enthusiasm for the TIP in the annual program evaluations. TIP Fellows consistently report that the program experience makes them feel valued as professionals. Teachers who feel supported and valued, who have access to resources, and who are intellectually stimulated will likely feel more satisfied with their work. By providing teachers with professional development and support, we strongly believe that TIP positively influences their decisions remain in urban education.

The Institute aspects that allow teachers to feel professional collegiality are significant. While the superb academic research portion of our program is the most highly visible outcome for strengthening effective classroom instruction, the development of complex support networks among diverse teachers may be the critical factor in encouraging teachers to stay in their positions. Together, these two facets of the Institute program experience seem to form the firm basis of why annual teacher feedback often includes the sentiment that the TIP program is the "best professional development ever" experienced by participants.

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## Adams: Notes

1. Yale National Initiative Web site.
2. *Commitments to Action on Educational Opportunity*, Executive Office of the President, December 2014.
3. *Ibid.*
4. National Assessment of Educational Progress, Department of Education.
5. Michael Godsey, The Deconstruction of the K-12 Teacher, *The Atlantic*, March 25, 2015.

## Coffin: Relevance

(continued from page 21)

The unit became a cry for activism on the part of my students:

"The government should listen to the voices of the people."

— India Montgomery, 12th grader

History repeats itself, and even though children repeat the mistakes of their parents without learning lessons from them, we can also learn from children. I made plenty of mistakes teaching this unit, whether it was an over-emphasis on reading, an under-emphasis on mixing up the activities, or talking too much when I should have been listening, but I gained a much deeper appreciation for the voices of my students. Although I thought I had written my unit out of a need to understand African American history, I discovered instead how relevant the work was to my own past, and to young people's understanding of the present.

Senior John Mosebay, who studied this unit for both years I've taught it, earnestly told me, "Power to the people meant more power for every citizen." He went on to say that he loved to talk about history, and that the unit gave him the opportunity to do so. "People then didn't just act up to destroy things; they had organization. They were willing to fight for what they believed in; they were willing to die."

I had intended to screen a film related to Ntosake Shange's *for colored girls who have considered suicide/ when the rainbow is enuf*, but at the end of the unit I took a risk instead and screened the film "Night Catches Us," a nostalgic look back at the Black Panthers, set in the Germantown of my childhood. The noise of the world drowns out individual voices; yet as Senior Anthony McQueen said in reflecting on the unit, "Every voice should be heard." Teaching and understanding lived experience, when one's back yard is the mirror of our small world, helps to that end.

## Carroll-Koch: Imagine

(continued from page 23)

creativity to fill their kits with all of their ideas. Asking quality questions, students explored different vectors and genetic therapies, all the while adding ideas to their tool kits. As genetic engineers, students practiced cutting out "sick" DNA, replacing it with "healthy" DNA, and then sending it back into the cell through a viral vector. In addition, students simulated silencing genes by flooding the cell with siRNA, which shut down the gene that coded for the production of a harmful protein.

Finally, armed with their tool kit of genetic arsenals and cell models, students worked in groups as engineers to develop solutions to diseases. Their ideas showed a deep understanding of the concepts as well

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### Students worked in groups as engineers to develop solutions to diseases.

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as innovative and creative approaches to their potential solutions. One group decided to create hospital ribosomes that repaired or removed broken code when RNA entered it. Another group sent siRNA into the cell, using a viral vector. Yet another group sent Nano robots, transported by viral vectors, into the cell that were programmed to recognize, hunt down, and zap their targets. A final group sent in a multifaceted arsenal, harnessing the power of the cell's DNA, which had a corrective splicing mechanism capable of recognizing and splicing out problematic genes.

Our young engineers are the future. Although hypothetical now, their innovative, bright ideas prefigure future solutions. As our students learn and grow, so will their ideas and technologies, making what was once merely a hope our new reality. You can do this! Teach your students to imagine the unimaginable and harness them with the power of DNA.

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# Eloquence

By Joseph R. Roach

Luis took the news about rising sea levels hard. A student in April Higgins's sixth-grade social studies class at Skyline Middle School in New Castle County, Delaware, he heard April speak about the vulnerability of low-lying localities to increased coastal flooding. He concluded that global climate change would inevitably put all of Wilmington under water. At that point, he put his head down on his desk in silent despair and stayed that way until the period ended.

As April recounts the episode in "Energizing Debate: The Pros and Cons of Renewable Sources of Energy," her cur-

*Joseph R. Roach is Sterling Professor of Theater and Professor of English, of African American Studies, and of American Studies at Yale University.*

## Energizing the Debate

By April Higgins

In my years teaching social studies at Skyline Middle School, located in New Castle County, Delaware, a class debate was something I always dreamed of doing with my sixth graders but never had the confidence to actually do. Then I met Joe Roach, Professor of Drama at Yale University. By taking his seminar on "Eloquence" and through his guidance, I was able to facilitate three lively debates in my classes that left my students energized and empowered.

### Day 1: Survey and Case Study

The first day of instruction included a preliminary survey in the form of a knowledge rating and a case study on a recent Delaware issue.

Students were provided several documents in a case study related to the power

*April Higgins is a History Teacher at Skyline Middle School in Wilmington, Delaware.*

riculum unit for the 2014 Yale National Initiative for public school teachers, she tried to reassure Luis and the other students. She hastened to emphasize that their local environment was a matter of legitimate concern but not fatal predestination. But words failed her. "No matter what I said," she recalled, "I could not assure Luis that everything would be all right. His sensitivity made me reflect on my method of delivery and the sequence of activities for the lesson. My instruction had greater emphasis on the negative impacts of sea level rise and not enough weight on the ways in which we can take action to improve the projected scenario for our city." That is the problem that April brought with her to Yale, looking to find a solution in "Eloquence," our seminar on how to increase the likelihood that words will succeed.

plant project that was rejected by University of Delaware students, faculty, and residents of Newark in 2014. One document — an interview — required students to identify the claims of each side and the evidence that was presented to prove their arguments.

Next, we read two articles to assist students in gaining a better understanding of the process Delawareans used to gain the public's awareness of the issue and stop the project. Last, the students watched a video clip of a town hall meeting to see persuasive speaking in action and provide a model for their debate.

Finishing with the model debate, we discussed the upcoming debate format and motions students will be participating in. Students picked from the following motions: Delaware should build a sea wall along its coastline as protection from the rising sea, Delaware residents should be mandated to use ethanol E85 Flex Fuel in their cars, and Delawareans should work toward the use of wind energy as its pri-

Before the seminar leader and the Fellows in "Eloquence" did anything else, we first had to learn to use the word *rhetoric* in a positive rather than pejorative sense. As the foundational system of the ancient arts of persuasion, "rhetoric" means finding the most effective way of telling the truth. It means finding the right words, which are not always the same words, for different audiences. When the truth is both complex and contested — as the truth about environmental issues is likely to be today — an adversarial format or debate is often the best rhetorical approach. That is the solution that April found for her problem of how to motivate Luis and the other students to take issues of climate change seriously while still keeping their heads held high. This time, as she eloquently explains, words didn't fail.

mary source of energy. For the sea wall debate, a few students reported that they have beach houses and the rising sea poses a threat to their vacation spot. Another student explained how she wants to be a marine biologist so she already has tons of good reasons why the sea wall should not be built. For the ethanol motion, a couple of students told me how they have experts in the field whom they would like to interview to gain more information. One child's grandfather spent his entire career working on cars and offered a wealth of information on the use of ethanol. Another student's neighbor is a chemical engineer and was able to help the student grasp exactly how ethanol is produced. The wind power debate had some powerful arguments as well. One student explained that he really needed to be in the wind energy group because his mom has to pay a lot of bills and he believes converting to wind energy will help bring her energy bills down. Others explained other benefits of wind power,

including a reduction in carbon dioxide emissions and Delaware's geography, which allows for offshore wind turbines.

## Day 2: Debate Teams Meet and Prepare

The students arrived to class on day two excited to learn which debate team they were on. I had the students establish roles within their team, including note takers, data organizers, and three speakers. In my inclusion class, with nine special education students and fifteen general education students, I only conducted two debates to increase the number of students on the teams. In this way, all of the students were able to participate without having to speak in front of the class or become frustrated with the amount of information to be collected in order to participate effectively in the debate. Many students in this class have difficulty reading, but in the small group discussions they were able to grasp the concepts. The larger groups also provided a buffer when students were pulled from class owing to disciplinary action, testing, or illness.

The students were given a little over sixty minutes to research their topic. I provided the teams with packets of various articles on their topic and allowed them to use the two computers and an iPad to look up any additional information. The energy and excitement in the room was contagious! Teachers and administrators passing by stopped in to see what the students were working on. The students were excited to find good information or develop a strong argument. They would dash to the computer to look up more information and run back to their group to share what they found.

To conclude the research period I gave each debate team a simulated speech from the opposing team to challenge them to form a counterargument with appropriate information. This part of the lesson was added to the unit as an afterthought, as I was uncertain how well the students would

handle responding to the arguments of the opposing team, instead of just making speeches about their topic.

## Day 3: The Debates!

I organized the classroom with the two debating teams on opposite sides of the room and the remaining students serving as an audience as they waited for their own



THE SOCIAL BENEFITS OF BIOCHEMICAL RESEARCH (DETAIL), 1941-43

debate to take place. Before beginning the debates the students filled in position sheets that included their position on the motions and their basis for it. During the debate they took notes and wrote questions for the teams and at the end of the debate explained their final opinion on the topic. The position sheet kept most of the students engaged while they watched the debates and helped me to understand what content knowledge they gained from their classmates.

The debates themselves were high energy, and the students took them very seriously. I gave them mini whiteboards to encourage note-taking while the opposing team was speaking. The teams really embraced the white boards, some using them to write key points for their speaker and others to draw diagrams that further emphasized their argument. The collaboration of teams during the debate almost brought me to tears, as the students were huddled together whispering and frantically working to come up with their plan of action.

At the end of each debate we celebrated both teams' effort and accomplishment with a round of applause. I explained the strengths and weaknesses of the arguments of both teams and determined a winning team based on a rubric included in my unit. For the most part, the students in the audience were able to predict which team was the winner based on the arguments and counter-arguments they made.

To conclude the unit I had the students complete a survey to assess their understanding of the unit objectives, as noted earlier, and gain feedback on the unit itself. In terms of the unit objectives, there was an increase of student understanding from the beginning to the end of the unit. The students reported that they liked having multiple debates with small teams, they enjoyed being able to pick their topic, and thought debating about Delaware issues made it more emotional, since it is our own state. A highlight for me was when a student asked whether he could speak with the principal to start an after-school debate team. Of course I said yes! The students offered suggestions, including more time for researching and allowing the students themselves to help decide which team was the winner for each of the debates.

This unit was a valuable experience for my students, and I plan to use it for years to come.

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# Playing with Poems: Rules, Tools, and Games

By Langdon L. Hammer

Who would think you could get a room full of ninth-graders in Pittsburgh (or anywhere else) to settle into reading and writing sestinas — a Medieval song form developed by the Troubadour poets of Provence? Moreover, aside from the pure good of getting ninth-graders to settle into anything, there is the question of *Why* anyone would want to do that. The sestina is not going to appear on a national or local assessment any time soon.

Let me answer the why question by backing up. To get at what poetry, in general, has to teach, we have to get over the fear of poetry. Students feel it; teachers feel it. This has to do with the fact that poetry is usually treated as something profound and serious. It isn't! Well, no, it is; but just saying so is not the way to show you what is profound and serious about it.

Most approaches to poetry, starting in the primary grades and going all the way to

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*Langdon L. Hammer is Professor of English at Yale University.*

## The Sestina

By Jennifer Giarrusso

*Editorial note: The image chosen for Jen's article is an Elizabeth Bishop watercolor, perhaps justification enough, but we also think it has to do with Bishop's "Sestina," the focus of Jen's curriculum unit. True, the parallel is far from perfect: the grandmother's "iron kettle sings on the stove" in the poem, but only beans and rice are in evidence in the picture; and the child in the poem thinks of a "flower bed," not a pitcher of flowers next to the stove. The child wants the flowers in "the front of the house," meaning perhaps that she wants a better life. And yet: the gigantic size of Bishop's watercolor flowers may suggest that they too belong elsewhere.*

college, focus on meaning. The danger in this approach is in turning poetry into something that has one right answer and is not something students might write, respond to, or care about once they leave

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Learning to play — collaboratively — the game of the sestina, Jen's students learned that it's OK to play with words. It's in this sort of play that we make and discover meaning.

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your class. Even for students who get good at finding meaning, the approach loses what is specific about poetry.

By which I mean its material, formal dimension — the fact, for instance, that poetry is typically organized in lines, according to rhythmic patterns and ele-

ments of repetition, all of which we respond to in the way we respond to music. Tuning into such patterns alerts us to the sensory properties of words, a dimension essential to meaning, rather than an adjunct to it, in all forms of communication. Meaning doesn't mean much without it.

I'm making poetry sound more profound and serious, and therefore more intimidating, than ever. But that's where games come in. Poetry involves a great deal of work, whether you are reading or writing it, but it's a kind of work that involves play. From the point of view of pattern, poems are games played by certain rules. And play is nothing to be afraid of.

These were the guiding ideas behind our seminar, and Jen Giarrusso made revelatory use of them in her curriculum unit on the sestina, a crazily-demanding verse form that, for reasons Jen explores in her unit, has a surprisingly vital place in modern poetry. Learning to play — collaboratively — the game of the sestina, Jen's students learned that it's OK to play with words. It's in this sort of play that we make and discover meaning.

One of the proudest moments in my teaching career happened last November after I returned from the reunion of the 2014 National Initiative. I stood in first period and watched one of my students — Izzy — smile in a way I had yet to see since meeting her in August. I had just told her and the rest of her class that I had spoken at Yale about the sestinas they wrote; that, specifically, I had read Izzy's group's poem, "Home Alone," in the reunion of my seminar and the professor was very impressed. She beamed in a way I'd never seen a student do before in reaction to news about their work.

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*Jennifer Giarrusso is an English Teacher at Allerdice High School in Pittsburgh, Pennsylvania.*

I walked into "Poetry: Rules, Tools and Games" apprehensively; I had always had a rough time teaching poetry to high school students (a senior once exclaimed, "I'm going to be an engineer, I don't need to read poetry!"). Some students liked poetry, but mostly because it was short. Most had experienced a lifetime of "not getting it," so they seemed incredulous that there would ever be a different outcome.

The unit I planned to redesign from our school's curriculum asked students to read a survey of "important" poems, review various poetic devices and create a scrapbook that reflected some aspect of their identity. Students typically enjoyed this unit, but mostly for its fluffiness — it involved touchy-feely creative writing, cutting and

pasting things, sometimes glitter — not much of a downside, really. But I wanted to adjust this project so that students would actually learn something new, not just review metaphors and similes, and actually build skills they would need to analyze poetry and literature in high school English classes. Most importantly, I wanted to figure out a way to teach poetry so it might put a smile on a child's face rather than a sneer.

This vague plan accompanied me to New Haven in July. I fumbled around with it for a few days of the seminar until Lanny showed us the sestina — particularly, John Ashbery's "Farm Implements and Rutabagas in a Landscape." This poem, which chronicled Popeye and his family (yes, Popeye the sailor man), made me smile. The sestina form comprises seven stanzas, six of which have six lines ("sest-") and an envoy with three. The end words of each line in the first stanza are also the end words in each of the other stanzas, moving to different positions, before all are repeated in the envoy. Although I was hesitant to write a unit about a type of poem I'd never seen before, Lanny encouraged me to go with it: the best teaching we do is about something we're excited about, he said.

The research portion of my unit focused on only the sestina, and I analyzed four different ones. Rather than scrapping the entire poetry unit for only sestinas, I added the sestina reading and writing as a "mini-unit," nestled into the scrapbook project. I chose to show my students "Sestina" by Elizabeth Bishop. I first asked them to read it and give their impressions — what stood out, what they noticed about the form. We then formed groups and wrote inquiry-based questions about the end words, each group focusing on one.

The sestina lends itself particularly well to topics over which there is obsession and the paradoxical feeling of moving through time yet not doing so — imagine moving toward the center of a circle in a spiral pattern. This is an incredibly hard thing to explain, but not terribly difficult to "feel"



ELIZABETH BISHOP, RED STOVE AND FLOWERS, 1955

when reading the sestina. The students began to get at this after reading "Sestina," but they still struggled; this was a weird form to them and a poem that certainly wasn't "easy."

After discussing "Sestina," the groups set out to write their own. I gave students a template (much like the letters one would write to label a poem's rhyme scheme) so they could easily create the end word pattern. This writing process turned out to be much more complicated than I expected, but equally as invigorating for everyone. Some groups had a rip-roaring good time while others calmly worked through the pattern as if they were solving a jigsaw puzzle. I had to talk one group around when one member wanted to write it all himself ("Group writing is AWFUL, Ms. G!") and mediate the disagreement of a group that couldn't settle on a topic.

The poems they wrote were amazing. They wrote about the seasons, a sloth who went to Starbucks, a group of animal friends, "websites," war, Pittsburgh, princesses, the Phantom of the Opera, one called "Interplanetary Love," and one about things that are cray-cray.

But Izzy's group's poem was my favorite. In a poem called "Home Alone," their subject was a young boy dealing with the challenges of growing up. Each stanza moved through a different stage of his life until, by the envoy, he was a father raising his own child. It reflected on growing up and old (with considerable prescience for a set of 14-year-olds) and how the things that excite us as children change as we grow, but never really go away. The treatment of the topic perfectly exemplifies the "feeling" of returning to an idea, but an idea that changes at each encounter. I knew this would be the poem I'd show off when I returned to Yale in October.

Most of the kids either go "oooooh" or seem unimpressed when I talk about my experience at Yale. This time, while everyone was delighted to hear that I shared their poems with REAL- LIFE YALE PROFESSORS, it was Izzy's reaction that made clear the impact this unit had had. Learning about a new type of poem, reading one and then writing her own, had led to one of those smiles that you can't squelch. For once, poetry had made a student smile rather than groan or complain.

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## Fry: Knowledge to College

(continued from page 11)

second article outlines her ongoing research into the importance of teacher retention in high-need schools, concluding with strong evidence that the Teachers Institute is a proven means of achieving this goal.

Yale Mathematics Professor Roger Howe has written for us before on the many subterranean implications of elementary arithmetic, and the difficulty students will have in developing higher math skills if they don't understand these implications. The challenge he addresses on the present occasion, with emphasis on place value and unit fractions, is the training of teachers to teach the Common Core. He points out that in other cultures with strong student outcomes, such as Japan and China, math teachers are offered, and need to be offered, a common core of professional development like the kind made available by Teachers Institute seminars.

We are very happy also to include progress reports from two Institute Directors, Director Alan Lee of the Teachers Institute of Philadelphia, and retiring Director Raymond Theilacker (our many thanks to you, Ray, for what you have done over the years, and our warmest wishes for a happy retirement!). Alan's success in negotiating the politics of Philadelphia education policy has been truly remarkable, and his account here of perseverance and success is most inspiring. Ray pioneered the experiment in working with and coordinating multiple school districts, and his account, with his similar emphasis on the obstacles thrown in teachers' way and the Institute's success in counteracting them, is similarly inspiring.

The accounts of these two fine Directors remind us — though in truth we need no reminder — that the Teachers Institute community sustained a very sad loss in July 2015. We mourn and pay tribute to the former Director of the Pittsburgh Teachers Institute, Helen Faison. When Helen retired in 1993 from her distin-

guished teaching and administrative career, having risen to deputy superintendent of Pittsburgh schools in 1983, she accepted a visiting education professorship at Chatham College. In 1999 she became Director and the guiding inspiration of the Pittsburgh Teachers Institute, while in the meantime taking on the job of Interim Superintendent of Pittsburgh schools. For many years thereafter, she attended the summer Intensive Session of the Yale National Initiative. We will never forget the perfect pitch of her messages from the podium: her charismatic and unusual mixture of dignified elegance, heartfelt compassion, suspenseful timing, gentle sarcasm, and dry wit. What a teacher! It was a pleasure and a rare privilege to listen to her, and to know her.

The rest of the issue is devoted to a tradition that has been in place since the founding of the Yale National Initiative. Fellows in recent national seminars describe what it has been like to teach the topic described in their curriculum unit. The Fellows' articles are introduced by notes from the seminar leaders describing their seminar and the author's curriculum unit. We begin this section of the present issue not with an introduction to an article, however, but with a tribute by Mark Saltzman to two teachers from the Diné Nation of the Navajo in northeastern Arizona who participated in his seminars on "Organs and Artificial Organs" and "How Drugs Work," respectively. Both of these teachers, Jolene Smith and the late revered Marilyn Dempsey, developed remarkable units showing the compatibility of "modern" medicine with traditional forms of natural healing. In honor of their work, we accompany Mark's tribute with an image by the well-known Navajo artist Harrison Begay: Medicine men making a sand painting of the kind used in healing rituals.

In this issue, we are pleased and honored to publish articles not only by Yale President Peter Salovey but also by the Dean of Yale College, Jonathan Holloway.

In introducing Sydney Coffin's account of teaching his unit, Dean Holloway emphasizes how much his own involvement with the Teachers Institute has influenced the way he thinks about the mission of teaching. To illustrate Dean Holloway's seminar, "Narratives of Citizenship and Race since Emancipation," we have chosen the lithograph by Thomas Kelly (after James C. Beard) of the Fifteenth Amendment according all male citizens the right to vote regardless of race, color, or previous condition of servitude. This lithograph was created in 1870, the year the Fifteenth Amendment was ratified, and depicts notable politicians and abolitionists together with scenes of African Americans participating in civic life.

Taking up our Contents henceforth in order, then, we begin with articles related to our seminars on STEM topics, as it is in these areas that we have arguably expanded our offerings most effectively, especially in the National Initiative; and as it is also in these areas that the urgency of preparing students in high-need schools for college is felt most acutely. We have two articles arising from work done in the 2014 seminar led by Paul Turner, "Microbes Rule!", and introduced by him here: Kathleen Tysiak's successful effort to get her AP Biology students comfortable reading primary sources in scientific literature on immunological diseases, and Vanessa Vitug's exciting account of virus battles, with the body a besieged castle and the students debating the strengths and weaknesses of attacking and defending viral armies. In Kathleen's article we place an image of a virus from Carl Zimmer's inspiring textbook, *A Planet of Viruses*, and in the San José-based Vanessa's article we place an abstract painting that *looks* like a virus by a nearby Northern California artist, the late Richard Bowman.

Arising from Mark Saltzman's 2013 seminar on "Genetic Engineering and Human Health," New Haven's own Laura Carroll-Koch devised a unit that carried

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her fourth graders (!) to startling heights of sophistication in the understanding of DNA. Yes, they made DNA models with gummy worms, like the fourth graders we all know and love, but their understanding of how DNA works and their prognostic and diagnostic skills under Laura's tutelage are truly remarkable. It looks as though her high-need children will be ready for college very soon! The image we've chosen for her article is a drawing of DNA from Mark's recent book, *Biomedical Engineering*. And from Gary Brudvig's seminar, "Energy Science," also 2013, we have Jinsue Hafalia's article, "Gasoline or Biodiesel?" on teaching students to understand, or at least to begin to understand, the environmental consequences of relying on fossil fuels. For this article the image is Ed Ruscha's ironic icon of gas guzzling at its most imperial, "Standard Station, Amarillo, Texas."

For the seminar Roger Howe taught in 2014, "Place Value, Fractions, and Algebra," emphasizing the topics that are centermost in his feature article here, Anne Agostinelli echoes Roger in stressing the importance of scaffolding for persons leery of math, and gives a moving account of "building fearlessness" in students who thought they'd never "get it." Numbers are complicated, their interactions are at once fluid and structured, and we feel that no artist gets this elegant intricacy better — with the possible exception of Mel Bochner — than Jasper Johns whose "0 Through 9" in the Tate Modern we reproduce for Anne's article.

We represent the Social Sciences (in each case as it happens in seminars where social history was evoked at least in part through visual images) with four articles drawn from three seminars. The 2012 seminar of Dean Jonathan Holloway, whose introduction we have mentioned, produced Sydney Coffin's intense account of teaching — with his usual Philadelphia specificity — the role of women in the Black Panthers and the Black Arts

Movement flashed forward to recent violence against Blacks, which Sydney calls "the Age of Michael Brown." For this article we could think of no better image than Shepard Fairey's famous poster of Angela Davis. For Mary Lui's 2014 seminar on modern urban immigration and migration, Krista Waldron developed a gripping account of the demographic in the region of Tulsa where she teaches, fashioning not so much an account of migration as of a stranded minority that develops ritual and esoteric codes similar to the ones Mary emphasizes. Apt for Mary's seminar, and placed in her introduction, is the image of northward flight, with fugitives from Jim Crow lined up at windows marked New York, Chicago, St. Louis from the first panel of the *Migration* series by Jacob Lawrence recently on exhibit at MoMA. As the caption to Lawrence's Panel 3 in the series puts it, "From every southern town migrants left by the hundreds to travel north." This is the work of Lawrence's youth — the series of 60 panels was completed during the Second World War when he was 23 — each image executed on a gessoed wood panel in an unheated Harlem loft. The reader is referred to an editorial note to Mary Lui's contribution, with a few more remarks about this series.

Two interesting and well-described projects came out of Tim Barringer's 2014 seminar, "Understanding History and Society Through Images, 1776-1914." Miles Greene describes the way he gets his students to understand the historically deplorable laboring conditions, especially for women and children in the United States, as the Industrial Revolution unfolded. Miles will describe his particular focus, but for our image we couldn't resist choosing the beautiful and subtle painting of American women going to work by Winslow Homer, "Morning Bell," in the Yale Art Gallery. Rodney Robinson develops his curriculum unit "Pain to Pride" with a focus on his home in Richmond and his school there. He

hopes on the activist side of his teaching to save the neighborhood of the old Lumpkin Jail in Richmond from developers, but the broader reach of his teaching is the history of slavery in Richmond, and to that end we choose for his article a Richmond painting by Eyre Crowe, "Slaves Waiting for Sale."

Our article by April Higgins from Joseph Roach's 2014 seminar, "Eloquence," takes us right back to "Energy Sciences," as the debates she stages, pitting modes of rhetorical skill against each other, concern the pros and cons of environmental issues in her state of Delaware. All these debates have to do with energy conservation, and to that end, resisting the temptation to show debaters staring each other down, we accompany her article with the directly appropriate painting by John Steuart Curry, "The Social Benefits of Biochemical Research."

And finally, from Langdon Hammer's 2014 seminar, "Playing with Poems: Rules, Tools, and Games," Jen Giarrusso successfully challenged her students to realize that poems aren't just tedious variants on "Roses are red" by making them come to terms with the sort of poem that forces you to understand why poems are written, the sestina. As he says, Lanny introduced his Fellows to the form with John Ashbery's "Farm Implements and Rutabagas in a Landscape," and for her students Jen chose to focus on Elizabeth Bishop's "Sestina." In celebration of that wonderful poem we choose Bishop's watercolor, "Red Stove and Flowers," which includes some of the poem's motifs.

Each of these teaching and learning experiences was clearly galvanizing for students. Anyone reading about them will wish to have been a student in each of these classrooms in turn. You can feel the excitement, and the intellectual awakening, which are all that's needed to propel high-need students into college, and to support the teachers of high-need students in their mission.

# On Common Ground®

## Strengthening Teaching through School-University Partnership

Number 15, Fall 2015

Yale-New Haven Teachers Institute®  
Phone: (203) 432-1080  
Fax: (203) 432-1084  
E-mail: [Common.Ground@yale.edu](mailto:Common.Ground@yale.edu)  
World Wide Web: [teachers.yale.edu](http://teachers.yale.edu)

Executive Editor, James R. Vivian  
Chairman, Editorial Board, Paul H. Fry

The Yale-New Haven Teachers Institute is an educational partnership between Yale University and the New Haven Public Schools designed to strengthen teaching and learning in local schools and, by example and direct assistance, in high-need schools around the country. Through the Institute, teachers from the university and the schools work together as professional colleagues.

Founded in 1978, the Institute is the first program of its type to be permanently established as a unit of a university. In 2004, the Institute announced the Yale National Initiative to strengthen teaching in public schools, a long-term endeavor to influence public policy on teacher professional development.

*(continued from front cover)*

exports the model to school districts elsewhere in cooperation with their nearby universities: Philadelphia and the University of Pennsylvania, multiple school districts in Delaware and the University of Delaware — with Institutes soon to come in Richmond, Chicago, Tulsa, and San José. Wherever the Institutes go, they improve teacher morale by fostering collegiality and empowerment among themselves while improving the teachers' knowledge and understanding of what they teach.

I was privileged to be part of the White House Summit in January 2014, the special theme of which was college access for first-generation students from low-income families. The initial theme of this gathering was how colleges and universities might change their own admissions policies to expand their applicant pool, but it gradually became clear that although certainly such steps could and should be taken, they would have only a limited effect in improving matters for high-need students. Admissions categories can only fluctuate within a limited range. Attention then shifted to additional ways in which universities could expand admissions pools, not just

*Peter Salovey is President of Yale University and Chris Argyris Professor of Psychology.*

Yale University  
Yale-New Haven Teachers Institute  
P.O. Box 203563  
New Haven, Connecticut 06520-3563

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their own, and that is when the Yale-New Haven Teachers Institute entered the discussion. While I was there, Gene Sperling and Arne Duncan took note of the Teachers Institute as an exemplary model for promoting these ends. Researchers have shown that the Institute approach promotes

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Our faculty has both an immediate effect on the teachers with whom they work and also a broader impact on the deeper problem concerning access to higher education that the country faces.

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the dimensions of teacher quality known to improve student achievement and encourages its participants to remain teaching in high-need schools. One study found that participants were almost twice as likely to remain teaching in their school as were teachers who had not taken part. Our faculty has both an immediate effect on the

teachers with whom they work and also a broader impact on the deeper problem concerning access to higher education that the country faces.

At the sequel to the January meeting this past December, Yale therefore recommitted to increasing the preparation and effectiveness of teachers in public schools that enroll a significant proportion of students from low-income families. In recognition of the Institute's contribution to this end, and toward the goal of ensuring an equitable distribution of effective teachers for engaging and educating students from low-income families, I have agreed to host a national Conference at Yale in October 2015 on the role of Teachers Institutes in supporting and retaining teachers in high-need schools.

To return in conclusion to the importance of the Institute model to our faculty: Whenever I attend the annual University Advisory Council meeting of the Institute, a couple of our faculty who have been seminar leaders tell the story of their seminars. They are enormously inspiring. I am a data-oriented social scientist, but their anecdotes and case studies really make this work come alive for me. It makes me wish I were still in the classroom and leading one of these seminars myself.