

Curriculum Units by
Fellows of the
Yale-New Haven Teachers Institute
Guide
2021

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Preface

In February 2021 teachers from New Haven Public Schools became Fellows of the Yale-New Haven Teachers Institute® to deepen their knowledge of the subjects they teach and to develop new curricular material to engage and educate the students in their school courses. Founded in 1978, the Institute is a partnership of Yale University and the New Haven Public Schools, designed to strengthen teaching and improve learning of the humanities and STEM fields in our community's schools. Through the Institute, Yale faculty members and Public Schools teachers join in a collegial relationship. The Institute is also an interschool and interdisciplinary forum for teachers to work together.

The Teachers Institute has repeatedly received recognition as a pioneering model of university-school collaboration that integrates curriculum development with intellectual renewal for teachers. Between 1998 and 2003 it conducted a National Demonstration Project that showed the approach the Institute had taken for twenty years in New Haven could be tailored to establish similar university-school partnerships under different circumstances in other cities. Based on the success of that Project, 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, in part by establishing in states around the country exemplary Teachers Institutes following the approach developed in New Haven and implemented elsewhere. Evaluations have shown that the Institute approach exemplifies the characteristics of high-quality teacher professional development, enhances teacher quality in the ways known to improve student achievement, and encourages participants to remain in teaching in their schools.

Teachers had primary responsibility for identifying the subjects on which the Institute would offer seminars in 2021. Between October and December 2020, teachers who served as Institute Representatives and Contacts canvassed their colleagues in New Haven public schools to determine the subjects they wanted the Institute to address. The Institute then circulated descriptions of seminars that encompassed teachers' interests. In applying to the Institute, teachers described unit topics on which they proposed to work and the relationship of those topics both to Institute seminars and to courses they teach. Their principals verified that their unit topics were consistent with district academic standards and significant for school curricula and plans, and that they would be assigned courses or grade levels in which to teach their units during the following school year.

Through this process four seminars were organized, corresponding to the principal themes that emerged during the canvassing. The seminars were:

- “The Social Struggles of Contemporary Black Art,” led by Roderick Ferguson, Professor of Women's, Gender and Sexuality Studies, and of American Studies;

- “Developing Anti-Racist Curriculum and Pedagogy,” led by Daniel Martinez HoSang, Associate Professor of Ethnicity, Race, and Migration and of American Studies;
- “How to Do Things with Maps,” led by Ayesha Ramachandran, Associate Professor of Comparative Literature; and
- “The Earth’s Greenhouse and Global Warming,” led by Peter Raymond, Professor of Ecosystem Ecology.

Between March and July, Fellows participated in seminar meetings online, studied the seminar subject and their unit topics, and attended a series of talks by Yale faculty members.

The curriculum units Fellows wrote are their own; they are presented in a volume for each seminar. The units, which were written in stages over time, contain five elements: content objectives, teaching strategies, examples of classroom activities, lists of resources for teachers and students, and an appendix on the academic standards the unit implements. They are intended primarily for use by Institute Fellows and their colleagues who teach in New Haven.

This *Guide* to the 2021 units contains introductions by the Yale faculty members who led the seminars, followed by synopses written by the authors of the individual units. The Fellows indicate the courses and grade levels for which they developed their units and other places in the school curriculum where the units may be applicable. Copies of the units are deposited in New Haven schools and are online at teachersinstitute.yale.edu. A list of the 233 volumes of units the Institute has published between 1978 and 2021 appears in the back of this *Guide*.

The Yale-New Haven Teachers Institute is a permanently endowed academic unit of Yale University.

James R. Vivian

New Haven
August 2021

I. The Social Struggles of Contemporary Black Art

Introduction

Black art has historically been not only a domain for various artistic representations but also a venue from which to recast and explore several historical and social struggles. While that exploration has obviously dealt with issues of race, slavery and colonialism, black diasporic art has also been a powerful venue for addressing issues of gender, sexuality, the environment, militarism, technology, and so on. Indeed, recent developments in scholarship, curation, and activism have exhibited the central place that black art occupies in engaging these issues.

These developments have placed at least two significant pressures on how we think of art, in general, and black art, in particular. First, these shifts have challenged conventional assumptions that art is best known and assessed according to its formal properties only. Instead, this rethinking in how we encounter art insists on placing it in dialogue with historical, political, and social contexts. Second, these transformations urge us to understand black art and the social processes that it engages within transnational rather than national frameworks. To this end, these approaches have eschewed frameworks that seek to contain art within any single national tradition and instead has located black art within both national and transnational social processes, movements, and struggles.

To this end, our seminar worked to place art by black artists from Africa, Europe, and Latin America in feminist, anti-colonial, anti-racist, abolitionist, environmental, and queer politics. As the Fellows engaged these works, they produced a dynamic set of conversations about the relevance of black contemporary art in this historical moment. Those conversations led to unit plans that are both pertinent and inspired. In their own individual ways, each one manages to address a variety of social issues and to present the intricacies of black art as well.

Leslie Blatteau's unit plan "Black Art and Climate Justice" powerfully uses the art of African American artists Maren Hassinger and LaToya Ruby Frazier and Kenyan artist Wanuri Kahiu to analyze the global parameters of the environmental crisis and the inequalities that occasion and emanate from it. Carol Boynton's "Contemporary Black Picture Book Artists: Families of Illustrators" creatively presents illustrators from African American families who see their art as a way of educating young people about race as a historical formation. Nataliya Braginsky's "Synopsis of Cultural Histories of 20th century Black and Latinx Freedom Struggles" brilliantly presents the visual art, music, performances, and fashion of black and latinx communities within the U.S. to demonstrate to students how cultural forms become participants in and records of historical struggles. Cheryl Canino's provocative unit plan "Blacks in Nature: Oxymoron or Paradox?" asks students to observe African American artists' engagements with nature as a way of illuminating the racialized meanings that nature has acquired in U.S. history.

Dan Croteau's "The Eye of the Beholder: A Critical Look at Visual Art and *A Raisin in the Sun*" proposes an intriguing exploration of Lorraine Hansberry's classic play and its resonance with visual artists such as Romare Bearden, Norm Lewis, and Emma Amos, using their art to explore the civil rights movement and battles over racial segregation. Melissa Dailey's "The Journey of the Artist: Storytelling to Transform" movingly proposes an examination of the healing powers of art, particularly for students who have had to negotiate social and epidemiological urgencies. In Cathy Ramin's excellent proposal "The Curator as Social Change Agent," she looks at the work that African American curators have done to foster transformations in U.S. society and the art world. Steve Staysniak's marvelous "Visual Literacy, Creative Response, and the Afrofuturist Aesthetic" proposes Afrofuturism as an interpretive framework through which students will analyze both art and society, paying particular attention to the work of the Mexico-based artist Clotilde Jimenez. Eden Stein's capacious proposal entitled "Historical Allusions and Art in Jacqueline Woodson's *Brown Girl Dreaming*" interrogates the vast visual, literary, musical, and social worlds presumed in Woodson's award-winning memoir. Eleanor Scranton's pertinent proposal "Contemporary Black Art: Race as a Metalanguage for Intersectionality" uses black visual art to explore the multi-faceted nature of identity, focusing on the work of South African artist Zanele Muholi and the Ghanaian American artist Bisa Butler among others. To engage black art and its social implications, each of the unit plans beautifully culminates in assignments that ask students to become artists and/or curators themselves.

Roderick Ferguson

Synopses of the Curriculum Units

21.01.01

Black Art and Climate Justice, by Leslie Blatteau

This unit, developed for a 12th grade International Issues course, uses a climate justice framework and an interdisciplinary approach to teach students about the intersections between colonialism, capitalism, and the climate crisis. Given that the climate crisis disproportionately impacts marginalized people, it is necessary to support students' understanding of its causes and effects using the lenses of race, gender, political power, and economic power. It is also necessary to study and celebrate resistance to colonialism, capitalism, and the climate crisis. The three sections of this unit are organized around three themes of resistance: Planetary Survival, Another World is Possible, and Defunding the U.S. Military. Each theme centers Black Art, specifically film, sculpture, photography, and prints from the 20th and 21st centuries, as evidence of resistance. Through the use of historical sources, current events, and the art of Wanuri Kahiu, Maren Hassinger, LaToya Ruby Frazier, and Emory Douglas, students will analyze dominant and counter narratives throughout the unit and create their own Black Art and Climate Justice Museum Exhibit.

(Developed for International Issues, grade 12; recommended for Current Events, International Issues, and World History, grades 9-12)

21.01.02

Contemporary Black Picture Book Artists: Families of Illustrators, by Carol Boynton

This three- to four-week visual literacy unit for primary students focuses on children's book illustrators who are from families of African American artists and authors. It uses a new lens and approach to bring the picture book art to students through literature throughout the year. This artist/author study includes the works of Leo and Diane Dillon, a husband and wife team that has been creating art together since they met at the Parsons School of Design in 1953; Jerry and Brian Pinkney, father and son, who have earned between them dozens of awards and recognitions for their work on children's books; and, Donald Crews, Ana Jonas, and their daughter, Nina Crews, all authors and illustrators of a great variety of picture books and stories.

The students will participate in five illustrator studies as they learn the bibliographies of the artists and the methods and styles of their work. After practicing the many ways picture books are illustrated, students will illustrate a book of their own based on a story they know very well – a fairy tale, a folk tale, or a family story of their own. The class will celebrate all of the artists at a class wide publishing party.

(Developed for Reading and Writing, grade K; recommended for Reading and Writing, grades K-2)

21.01.03

Cultural Histories of 20th Century Black and Latinx Freedom Struggles, by Nataliya Braginsky

This unit revolves around the 20th century and the Black and Latinx freedom struggles of that era. The goal of this unit is not only to teach this critical history, but also to introduce students to a new way of learning history: through the lens of cultural studies. We can learn a lot about a historical era and a people by examining their cultural production. A people's culture—their visual art, music, dance, and fashion—can be an expression of their joy, pleasure, beauty, and humanity, as well as their struggle, their rage, and their resistance to domination. This unit will focus on Black and Latinx cultures of resistance created in the US throughout the 20th century, including bomba and plena, the blues, zoot suits, the graphic art of the Black Panther Party, drag balls and disco, and hip-hop. By analyzing these creative expressions of resistance, students will learn about the political history that created the oppressive conditions to which the art is responding. More importantly, students will analyze the ways in which the cultural production can also be a political response, oftentimes with real political impact.

(Developed for African American and Latinx History, grade 12; recommended for African American and Latinx History, grade 12; U. S. History, grade 10; Civics, grade 11; and Art, grades 9-12)

21.01.04

Blacks In Nature...Oxymoron or Paradox? by Cheryl Canino

How do we help African American students connect with nature? How do we frame the narrative, so we don't further victimize students but still acknowledge the historic relationships of involuntary servitude, sharecropping, barred or segregated entry in public parks, "picnics" where black flesh was on the menu, or the invisibility of ancestors by European Americans? This unit seeks to empower students to develop agency to forge relations with nature not restricted by fear or exclusion and reframe their narrative to be included too as stewards of nature?

This unit aims to provide a framework for exploring the fluid construct of nature and environment and its intersectionality with race as an instructional strategy supporting English Language Arts student discussion and comprehension skills. The unit uses visual art reflective of a nonwhite cultural point of view as a launchpad to commence class discussions buttressed by reframed visual images and written literary and nonfiction texts, involving small and whole groups about the construction and deconstruction of the concepts of race and nature. The unit seeks to maximize student assets (how students

interact with the text) while minimizing student costs (mandating scripted discussion protocols) before such discussion protocols are learned.

Keywords: Nature, Environment, African American, Black, Black Arts Movement, Landscape, Critical Race Theory, Latinx/Critical Race, TribalCrit, AsianCrit, Western, Discussion Literature Analysis

(Developed for English 2 and English Honors, grade 10; recommended for English Language Arts, grades 7-8; American History, grade 10; and Law, grades 11-12)

21.01.05

The Eye of the Beholder: A Critical Look at Visual Arts and “A Raisin in the Sun,” by Daniel Croteau

Students will be reading the core text *A Raisin in the Sun*. While reading, students will examine the text from the lens of the writer Lorraine Hansberry’s political beliefs. One lens students will use in their examination of the work is Edward De Bono’s Six Hats method to think deeper about various forms of texts including art, media, and traditional text. While doing so, students are asked to think about the motivations of the creators and the impact the work has in terms of the creator’s view on particular social movements. The culminating activity in the unit asks students to create their own piece of art to be observed and reflected upon by their peers.

(Developed for Language Arts, grade 8; recommended for Language Arts, grades 7-8, and English, grades 9-12)

21.01.06

The Journey of the Artist: Story-telling to Transform, by Melissa Dailey

This unit will be used with the AP English Literature students, but it is primarily written to cater to high school English students. My students have shared that music has been key to getting through difficulties in their lives during the pandemic or otherwise. It inspired this idea of the healing power of art with the guiding text “Sonny’s Blues” by James Baldwin. We will read “Sonny’s Blues” by James Baldwin and *Citizen: An American Lyric* by Claudia Rankine. Some of the artwork we will look at includes works from Trenton Doyle Hancock, David Leggett, Nick Cave, Kara Walker, Zanele Muholi, Bisa Butler, and Yinka Shonibare.

The students will explore the literary and art materials to analyze their transformative and/or healing elements. Through this exploration, students will sharpen their own voices and find within themselves a cause worth expressing for, fighting for and/or healing from. They will work on creating playlists as we travel through the texts and artwork.

They will also create a piece of artwork with an artist's statement that we can publish in a magazine representing the whole class's effort and aspirations.

(Developed for English 4 and AP English Literature, grade 12; recommended for English, grades 9-12)

21.01.07

The Curator as Social Change Agent, by Cathy Ramin

This unit is about the role of the curator in the art world and their power to confer value within a culture. The intended audience for this unit is a high school entry level art class entitled Exploring Visual Design taken by all high school grade levels. The goal of the unit will ultimately be to address Anchor Standard 6 in the National Core Art Standards by asking students to curate their own art exhibit that communicates a message and conveys meaning to their intended audience. Students will be asked to consider what role artists, galleries and curators can play in creating a dialogue to promote social change. Along the way, students will also explore themes of identity, community and representation as they prepare for their role as curator.

This unit is designed as a Project Based Learning unit rooted in inquiry and student guided research. Through the study of African American artists and curators from the 1960's to the present day, students will understand that representation has been a hard-fought battle for artists of color. Over the course of 4 weeks, students will take a field trip to the Yale Art Gallery, speak with working curators and curate a show around a theme that they think will connect to their chosen audience.

(Developed for Exploring Visual Design, grades 9-12; recommended for Photography 1-2 and Mixed Media, grades 9-12)

21.01.08

Visual Literacy, Creative Response & the Afrofuturist Aesthetic, by Steve Staysniak

This unit is centers on two equally important notions. First is that visual literacy has an important place in the secondary English classroom. Second is that students need meaningful opportunities to respond to text through the creation of their own texts. Set in the context of an 'Afrofuturist Aesthetic,' this unit supports teachers by introducing some of the theory beneath the concepts of visual literacy, writing about contemporary art, critical response, and the Afrofuturist perspective. Students are asked to create a framework for visual analysis and then to put that framework to use examining three works by Clotilde Jimenez. Finally, students respond to Jimenez's work by creating their own mixed-media collage.

(Developed for English, grade 9; recommended for English, grades 9-12)

21.01.09

Historical Allusions and Art in Jacqueline Woodson’s *Brown Girl Dreaming*, by Eden C. Stein

This unit revolves around the award-winning memoir in verse, *Brown Girl Dreaming*, by Jacqueline Woodson. Supplementary texts, including fiction and nonfiction poetry, picture books and articles by and about Woodson and the topics alluded to in her memoir, including brief biographies of figures from the Civil Rights Movement and primary sources, are also studied alongside the memoir. The unit explores analysis of visual art such as photographs from the era (1960s and 1970s) and works depicting black youth as well as the settings she writes about (Ohio; Greenville, South Carolina; and Brooklyn). Music that Jacqueline Woodson mentions in her memoir, along with additional songs from the Civil Rights Movement, can be listened to, analyzed, and responded to. Connections are drawn with the Black Lives Matter movement as well as students own cultural and personal identities. In addition to responding to the various texts, students will have an opportunity to engage in creative writing. To engage in the theme of identity, students write their own brief memoirs in verse, as well as creating works of art. This unit was designed for seventh grade students at a small, highly diverse middle school, but could be taught to a grade higher or lower.

(Developed for English Language Arts, grade 7; recommended for English Language Arts, grade 8; English Literature, grades 9-12; and African American History, grades 7-9)

21.01.10

Contemporary Black Art: Race as a Metalanguage for Intersectionality, by Eleanor Scranton

This unit is designed for middle-school students in the Content Area of Visual Art focusing on Identity Politics, Voice, Critical Race Theory, Activism and Social Justice. The unit is accessible for modification and inclusion of all grade levels. Anti-Bias and Anti-Racist training interwoven with Social-Emotional Identification and Self-Care gives students skills and guidance to navigate humanity in the twenty-first century. The objective of the unit is for students to gain critical awareness of the self in the past, present, and future. Students will be able to project and assist in their vocality and aspirations for the self and the collective. Students will explore critical race theory and identity politics in relation to the self and their visual art practice. Through research and application, students will consolidate, frame, and expand their visual thinking to be full of self-determination and self-respect. Through critical analysis, students will activate their critical conscience and create a voice that is written, spoken, and established through visual representation. This visual art practice will give students a voice for change and act as a facilitator to sustain all paths of liberation.

(Developed for Studio Art, grades 5-8; recommended for Art, grades 5-12)

II. Developing Anti-Racist Curriculum and Pedagogy

Introduction

The summer of 2020 sparked a series of reckonings among many educators about the role of race and racism in public school curriculum, pedagogy, and classroom culture. Teachers and schools endorsed new statements of solidarity. Promises of personal reflection proliferated. Yet even among teachers committed to anti-racist education, a central challenge remains. In the words of teacher educator Meredith Sinclair, how do teachers move from “disposition” to “manifestation,” or from attitude to practice? And more particularly, what does it mean for teachers in diverse fields—math education, language arts, music—to transform the ways they teach, design curriculum, and engage students through an anti-racist framework?

These questions animated the work of 11 New Haven teachers in “Developing Anti-Racist Curriculum and Pedagogy.” The seminar began by exploring the ways that K-12 education in general and the academic disciplines in particular have been organized around ideas of racial colorblindness, objectivity, and neutrality, often denying any connection to racial power or contemporary inequality. Yet a closer investigation reveals a far more complicated relationship. Many academic disciplines in the humanities, natural sciences, and social sciences have their origins in white supremacy, Eugenics, and nativism, and continue to bear those legacies today. Indeed public education, with its histories and ongoing practices of race and class segregation, tracking, intelligence testing, unequal funding, and heavy-handed discipline policies, have never been color-blind or apolitical.

As the seminar progressed, participants considered the ways these racialized histories have shaped dominant approaches to teaching and learning in their own subject areas. Why, for example, are most approaches to math education rooted in processes of hierarchy and sorting that label some students as capable and adept while leaving many others frustrated and disinterested in math? Why do the dominant approaches to music education and performance often focus on a single tradition of European classical music and similarly rank students into rigid orders of “genius” and failure? Many other fields, from science education to expository writing to foreign language instruction, bear similar patterns and outcomes.

The curriculum units produced by Fellows demonstrate how teachers in these subject fields can reimagine and transform their curriculum and pedagogy to engage students in complex modes of learning that do not reproduce long-standing structures of inequality and disposability.

For example, music educator Henry Lugo’s unit, “**Anti-Racist Pedagogy and Counter-Narrative Repertoire for the Middle School Orchestra**” reimagines orchestral

instruction and music history and provides teachers with new arrangements to broaden the musical repertoire they can introduce to students. Lauren O'Brien's unit, **“Using Multilingual, Immigrant, and Refugee Students’ Voices to Disrupt Racism in English Language Instruction”** helps to “disrupt the racist ideas that permeate teaching English as a ‘second’ language (ESL)” through an inventive set of pedagogies.

Amy Brazauski's **“Rethinking Social Justice Research in the High School ELA Classroom,”** draws on a range of influences, including Critical Race Theory and Cultural Community Wealth to facilitate student engagements with difficult social and political issues, culminating in a public Social Justice Symposium and website.

Marco Cenabre's unit, **“Recentering Humanity: An Anti-Racist Approach to Narrative Writing”** aspires to transform futile “approaches to writing instruction that attempt to teach the TikTok generation to sound like Henry David Thoreau.” Cenabre emphasizes collective practices of writing and expression centered in “academic rigor and collective joy” driven by the genuine experiences of students.

Rose Murphy's **“Environmental Justice in Literature: Review, Resistance, Renaissance”** likewise challenges the dominant racism-blind orientation to the study of literature about the environment and focuses instead on the resources and creativity that subordinated groups have brought to address environmental issues and futures.

Val Karanxha's unit, **“The Legacy of Francophonie in Post-Colonial Africa”** encourages French language instructors to draw on the vast cultural, linguistic and social repository of Francophone Africa as an alternative to the focus in traditional second language instruction on formal grammar and linguistics divorced from histories of colonialism, racial formation, and social identity.

Anti-racist curriculum and pedagogy also have generative uses in math education and statistics, as demonstrated by the units by William McKinney and Kathleen Rooney. Rooney's **“Seeing Race in Statistics”** and McKinney's **“Eyes Wide Open: E(race)ing Color-Blindness in the Math Classroom”** both counter the prevailing color-blind and power-blind approaches that characterize these fields while developing the necessary skill-based competencies among students.

The last three units are authored by middle school teachers, demonstrating the importance and applicability of anti-racist curriculum and pedagogy for students before they reach high school. Carolyn Streets' **“The House On Mango Street: Examining Race, Racism, and Power”** places the widely taught novel by Sandra Cisneros into a framework attentive to questions of culture, identity formation and inequality.

Felicia Fountain's unit for eighth grade social studies students, **“Invisible Incidences in America-The Great Migration and Destruction of Thriving Black Communities”**

examines issues of racial violence, dispossession, community formation and resistance across the 20th century, rooted in a range of innovative pedagogical techniques.

Finally Dena Vaillancourt's "**Adding Race Consciousness to the Slavery Curriculum**" similarly supports students in understanding the complex ways that white supremacy and racial formation nurtured the development of slavery in the United States, while helping students to contemplate the legacies of these systems today.

Daniel Martinez HoSang

Synopses of the Curriculum Units

21.02.01

Anti-Racist Pedagogy and Counter-Narrative Repertoire for the Middle School Orchestra, by Henry Lugo III

This is a curricular unit designed specifically for the middle school string orchestra, but the concepts, ideas and pedagogical practices put forth within it can be implemented in most performing ensembles. The unit seeks to broaden the repertoire and pedagogical techniques utilized in directing middle school orchestra. It aims to do this by rethinking dominant pedagogical approaches and reexamining which narratives are presented in rehearsals and for what purpose. The curriculum is divided into four units that will provide specific activities for the teacher and includes the resources to facilitate implementation. The resources include:

- Original string orchestra arrangements for the middle school-level musician to be used as repertoire
- Original presentations using the interactive web-based platform Padlet
- Rethinking dominant approaches for teaching basic rhythmic reading skills through the presentation of the South Indian rhythmic system solkattu
- Techniques for creating community within the orchestra through socially minded rehearsal pedagogy

The curriculum makes the case that there is a need for not only a refocusing of what the goals of musical performing ensembles should be, but that widely accepted teaching practices of performance ensembles has been co-opted by an agenda that seeks to serve and maintain white supremacy within the discipline of music education. By examining the widely accepted practices and routines of music education, this unit will provide the rationale and distinct moves by which the educator can counter these inequities. In doing so, the teacher reaches more students regardless of their background because students will be made aware of counter-narratives that is rife with dominant narratives. The curriculum will help the teacher include counter-narratives in their instruction in a seamless manner and provide a framework for restructuring instruction moving forward. The inclusion of counter-narratives also provides the teacher with the opportunity to dialog with students about history and other issues surrounding Civil Rights and equity more broadly in a way that will feel more organic and less “forced” as these discussions will relate directly to the material in the lessons. In that way, this is not really a curricular unit to begin and finish, but a way to start rethinking what, how and why we teach a performance class like orchestra.

(Developed for Orchestra, grades 5-8; recommended for Orchestra and Strings, grades 5-8)

21.02.02

Using Multilingual, Immigrant, and Refugee Students’ Voices to Disrupt Racism in English Language Instruction, by Lauren O’Brien

The purpose of this unit is to allow middle school students the opportunity to learn English language skills while uplifting and honoring home language, culture and identity to disrupt the racist ideas that permeate teaching English as a “second” language (ESL). Through culturally responsive materials, discussions, and experiences that amplify student voice and identity as immigrants, refugees and/or multilingual learners, students will work toward developing English language skills in reading, writing, speaking and listening.

The central message that students should take from the unit is that their language and identity are valued equally to that of their English-speaking peers. The unit will begin with observations taken from traditional ESL and Newcomer textbooks, literature and other sources. We will analyze the messages that these creators are projecting and discuss how this promotes racism through the focus on a “proper” form of English and White, Eurocentric language and culture. Students will analyze different depictions of immigrants from literature and the media to find what narrative racialized American society tells about immigrants, refugees and multilingual learners. We will contrast these messages to those in the core text for the unit, *Other Words for Home*, by Jasmine Warga. As we read the novel, we will spend time discussing and writing about experiences with immigration, learning English, and personal identity to create authentic narratives of immigrants, refugees and multilingual learners. These personal narratives will be compiled into an anthology that can be used as a resource for the school in the future. As a parallel project, students will work together with native English-speaking peers to create a simple website for the school that helps students and staff learn and practice all represented languages, not just English.

(Developed for English Language Instruction to Multilingual Learners, grades 6-8; recommended for English Language Instruction to Multilingual Learners and Language Arts, grades 6-8)

21.02.03

Revisioning Social Justice Research in the High School English Classroom, by Amy Brazauski

Today’s educators are familiar with the practice of social justice and the ideals of teaching students to think about their position as young agents of change. However, there is a risk of “performing” social justice that emphasizes rhetoric without leading to concrete action. Leaving students disengaged from both the classroom and the community. In this unit, “Rethinking Social Justice Research in the High School ELA

Classroom,” educators are asked to reexamine their understanding and practice of social justice by considering the connection to Critical Race Theory and the essential role of educator and student action beyond the classroom. The unit encourages educators to challenge the dominant way knowledge is traditionally positioned in their curriculum. Inspired by the work of Communal Cultural Wealth (Yosso) and Indigenous researchers, the unit welcomes community sources of knowledge as essential to the research process. Students in turn are empowered to hold and lead conversations to engage differing perspectives amongst their peers as well as larger communities. The unit culminates in a Social Justice Symposium that invites community leaders and family members that have inspired and engaged students throughout their learning process and give students the opportunity to share their collected knowledge with their community. Throughout, students collectively contribute to a website that documents on-going research on social justice issues in their community.

(Developed for English, grade 10; recommended for English and History, grades 9-10)

21.02.04

Recentering Humanity: An Anti-Racist Approach to Narrative Writing, by Marco Cenabre

The current English Language arts classroom consists of futile attempts to teach the TikTok generation to sound like Henry David Thoreau. Working in tandem with oppressive educational frameworks, the mainstream practices in teaching narrative consists of methods purposed toward a singular goal: mastering the craft and structures of what’s considered Standard English. By design, on both the teacher and student end, narratives that can be translated into formulaic structures that take precedence over all other personal experience, subduing the creative, cultural, and academic value that comes with storytelling. This curricular unit has two major functions. The first is to identify and analyze dominant methods and practices that uphold the current structures of teaching narrative writing. This analysis includes unearthing American Literature’s past and present relationship with White Supremacy and it’s operation as a subtle construct of systemic racism. The second is to curate sustainable, structural, and easily implementable solutions, by way of anti-racist pedagogy, to directly counter dominant practices, and at the same time, bolster the engagement, academic rigor and collective joy that comes with creative writing. In other words, it’s my intent to create space and agency for students to develop a personal narrative that is actually *personal*.

(Developed for Literature, grades 11-12; recommended for Literature, grades 9-12)

21.02.05

Environmental Justice in Literature: Review, Resistance, Renaissance, by Rose Murphy

In this 10th grade English unit, students will explore environmental justice through contemporary issues related to environmental racism. Students will develop a more complex understanding of intersectional environmentalism and of environmental issues in their own community and around the world, especially in examining how environmental racism and settler colonialism have shaped and continue to shape communities today. Through examining literature, nonfiction, poetry, art, and other media, students will broaden their understanding of their environment, explore and evaluate the human decisions that shape their environment, and engage in persuasive writing to impact the structures at work in their communities. Through engaging in the unit, students will challenge the inaccurate and harmful narrative of environmental literature often presented in high school classes as colorblind and removed from discussions of race and racism. Special emphasis will be placed on writers and artists using their craft as 1) resistance to environmental racism, and 2) as a renaissance in environmental literature and art, celebrating the intersection of identity and environment.

(Developed for English 2 and English 2 Honors, grade 10; recommended for English 2, grade 10, and English 3, grade 11)

21.02.06

The Legacy of Francophonie in Post-Colonial Africa, by Valbona Karanxha

This unit is part of the anti-racist curriculum writing seminar at Yale New-Haven Teacher Institute.

I start the research with a pedagogical explanation of second language acquisition and the focus of language teachers. This approach sheds light on the fact that, as language teachers, we focus mainly on the linguistic component that does not have much to do with the teaching of social justice emphasizing that culturally responsive pedagogy is lacking from our curriculum. Hence, it is a systemic problem – not only in the inner city schools – but everywhere. After retaking the topic of social justice in the subject that I teach - French - I decided to explore a little further. First, I focused on the Francophonie as part of France's colonial legacy in Africa. Secondly, I give a panoramic view of the colonization of Africa through the assimilation theory and the physical - yet non-cultural inclusion of Black Africa in the French political and administrative system. Thirdly, I discuss the ruling ideology and the ideology of the oppressed, which will be the biggest promotor of post-colonial French African art, literature, music, etc. Lastly, I have included three activities for teachers to reflect on and find useful meaning for their lessons of French language and culture.

(Developed for French levels 3-4; recommended for French levels 3-4)

21.02.07

Eyes Wide Open: E(race)ing Color-Blindness in the Math Classroom, by William Lawrence McKinney

The focus of this curricular unit is twofold. The first is to consider the math classroom as a racialized space. In doing so, the unit will shed light on why math education is not race-neutral and will explain how color-blindness reinforces the oppression of students of color. The unit will examine how color-blindness within mathematics education ignores historical data and blames academic failure on students, their families, and their communities without recognizing the systemic biases that reproduce racial inequality through material stratification, deficiency framing, and reduced access to high quality instruction.

The second part of the unit will consider anti-racist teacher-centered instructional strategies that directly address inequality in math instruction. Among these strategies, the unit will consider teaching for understanding, group participation through complex instruction, culturally relevant pedagogy, and teaching mathematics for social justice. To achieve this, the unit will review a series of activities meant to be interspersed throughout the year in a Geometry classroom. The activities are inspired by the Data Portraits of W.E.B. Dubois and provide a culturally relevant and meaningful way to engage students in mathematics without sacrificing the standards. Students will examine (1) inequality in access to educational resources, (2) overcrowding in large urban schools, (3) hunger and food insecurity within urban settings, and (4) racial inequality in policing as evidenced by traffic violations. Students will create artwork in the form of data portraits as a means of establishing a counter-narrative. Then, the unit will examine a brief race-neutral Calculus lesson on integral approximation and will highlight components that reinforce systemic racism. Finally, the unit will then address what changes must be made within the sample lesson to better address issues pertaining to race in the math classroom.

(Developed for Pre-Calculus, grades 9-12; recommended for Geometry, grades 9-10, and Calculus, grade 12)

21.02.08

Seeing Race in Statistics, by Kathleen Rooney

This unit is called “Seeing Race in Statistics”, and it will be used as the first unit in an introductory statistics course. The base layer of this unit is pedagogical. The goal is to incorporate practices that have been identified to increase equity in the mathematics classroom, particularly for students who have been historically excluded in the dominant conversations about mathematical excellence. The second level is focused on challenging the dominant propositions and undercurrents of power in the study of statistics through

lessons that examine the history and role of statistics within our racialized society. Specifically we will scrutinize variables that are accepted as truths and look at their role in shaping our perceptions of data. We will also look at examples of resistance statistics and in doing so, introduce the important work of these resistance mathematicians. Level three is the statistical content. This unit introduces students to the basic notions of data collection and organization. Students will be able to plan a study of a categorical variable and display the data in an appropriate graph. They will identify a variable of interest and think critically about how best they can measure that variable and what unplanned meanings could be inferred from the variable as measured and displayed.

(Developed for Statistics, grades 10-12; recommended for Statistics, grades 10-12)

21.02.09

***The House On Mango Street: Examining Race, Racism, and Power*, by Carolyn L. Streets**

This unit focuses on an approach to teaching the novel *The House on Mango Street* (Cisneros, 1984) through a culturally responsive pedagogical lens. Building upon discussions from the 2021 Yale Teachers Institute Seminar Developing Anti-racist Curriculum and Pedagogy, this unit first recognizes the research on culturally responsive pedagogy, its implications for the 21st Century classroom, and how the tenets of culturally responsive teaching can facilitate deep critical thinking on issues of race, racism, and power that underpin the novel. It examines past instructional moves used during novel study and presents how arts integration is used to present a critical remix of past practices. This unit seeks to develop students' thematic interpretations and understanding of the novel within a culturally affirming context.

(Developed for English Language Arts, grade 7; recommended for English Language Arts and Social Studies, grades 7-8)

21.02.10

***Invisible Incidences in America-The Great Migration and Destruction of Thriving Black Communities*, by Felicia Fountain**

Social Studies is the study of the interactions of people, events, geography, economics, and society. What happens when the training and content that many history and social studies teachers have used contains deep fault line fissures and misrepresentations? In this four to six-week curriculum unit designed for 8th graders, students will explore and research events in history from 1910 to the 1970s. Many of these events are rarely mentioned in most Social Studies textbooks, curricula, or resources.

Essential questions for this unit are:

- How can social studies investigate a history of racism?
- What is anti-racist education?
- How can educators and students work to remix our current social studies curriculum to emphasize anti-racist learning?
- How are people affected by marginalization and erasure?
- How does a dominant narrative develop?

Students will engage in viewing and researching videos and artifacts about thriving black communities that developed in the early 20th century amidst the violence of Jim Crow. The dominant narrative about US History from the end of Reconstruction to the mid-20th century has often portrayed Black people as hopeless and destitute. In reality, many Black people left the south, moved north or Midwest to establish flourishing communities. Black communities in Tulsa, Knoxville and Chicago were making great progress in the first two decades of the 20th century. But during the Red Summer of 1919, the aforementioned communities and others were burned down by white mobs and never rebuilt. One community was burned down and filled in with water, later becoming a lake. These mobs murdered blacks, decimated their townships, and then attempted to conceal this history, often erasing it entirely from history books.

Students' culminating project is research, documentation, and presentation of their findings through a student-led Community Action Event.

(Developed for Social Studies, grade 8; recommended for American History, African American Studies, and Black and LatinX Studies, grades 9-12, and U.S. History, grade 8)

21.02.11

Adding Race Consciousness to the Slavery Curriculum, by Dena Vaillancourt

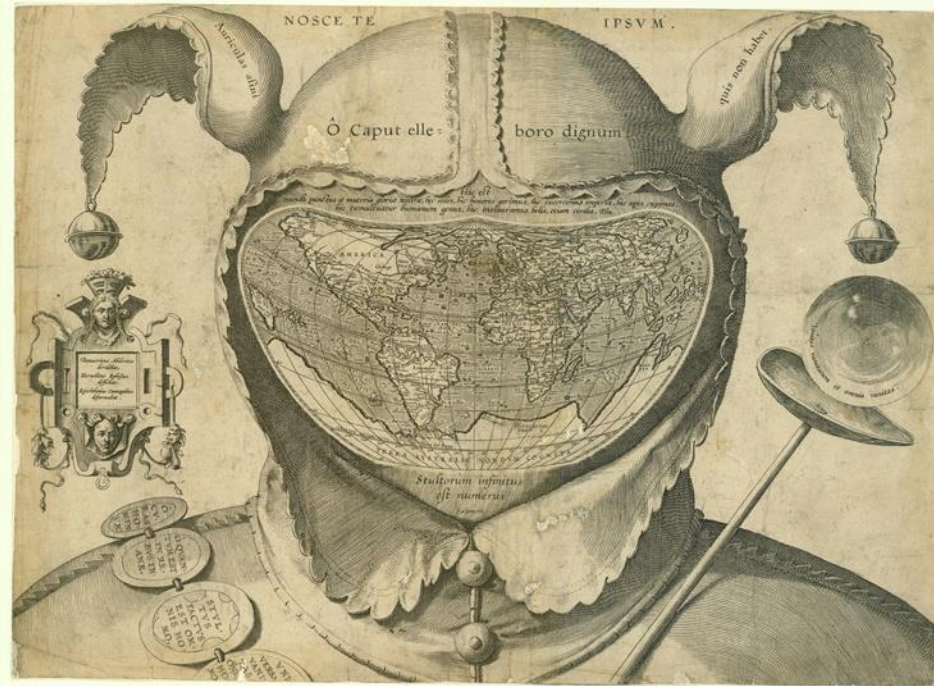
Students are often taught the history of American slavery, but this is often devoid of the history of racism and the direct ties between the two. This has been true in my own teaching. As a result, in this unit I aim to help students see this connection, hopefully helping them understand how Americans justified the enslavement of Africans and how some of these same ideas continue to perpetuate systemic racism in our country today. Ultimately, the goal of this unit is to have students gain a more holistic understanding of the connection between slavery and the growth of racism and white supremacy in the United States and the continued legacies today, so that students can investigate ways to become change agents to combat systemic racism. Within this unit, students will be introduced to the history of slavery in the United States and will focus on the system's connections to the growth of racism and white supremacy. Students will explore the evolution of slavery in America as well as the various justifications for this institution.

Lastly, students will explore the connection between slavery and systemic racism in the United States today and the ways that people are taking a stand against it.

(Developed for Social Studies, grade 8; recommended for Social Studies, Middle School grades, and U. S. History, High School grades)

III. How to Do Things with Maps

Introduction



“Cordiform World Map in Fool’s Cap,” [Novacco MS 2F 6, <https://www.newberry.org/file/1366>]. Courtesy of the Newberry Library.

The anonymous Fool’s Cap Map, published sometime around 1590, shows the striking juxtaposition of a then state-of-the-art world map inside the motley hat of a court jester (or Fool). Entitled, “Nosce teipsum” – know yourself – the engraving evokes the merging of world and self as the map image becomes the figure’s face. We can only know the world through the self, it seems to suggest—or, alternatively, know the self through its connections in and with the world. More important, perhaps, it embeds the map itself—a now-iconic emblem of mathematical accuracy, empirical proof, and scientific method—into a deeply humanistic, allegorical, and moral matrix suggesting the inextricable relations between science and art.

This seminar took up the invitations to thinking, reflecting, representing and interpreting contained in this print, which was produced in the midst of the “cartographical revolution” of the sixteenth-century. Beginning with the premise that maps both create narratives and influence the shape and interpretation of texts, the participants considered how maps as historical objects offer narratives about how we imagine and organize ourselves in psychological, spiritual, social and political terms. But to get to this perspective, we had to interrogate our assumptions about what maps actually *do*. Are

maps simply tools to help get from *here* to *there*, static forms of the ubiquitous GPS navigators we all use today? Are maps visual representations of places—or are they schematic and complex reflections on what we understand space and place to be? What sorts of objects count as maps: is a mood meter a map? Is an online data visualization a map? When are tattoos, tablets, sculptures and religious diagrams also best understood as maps? Taking our cue from J. L. Austin’s classic account of speech acts in *How to do Things with Words*, which argues that words can make things happen in the world, we asked how individuals, states, and cultures have “done things with maps,” and how, as teachers, we might “do things with maps” in the classroom.

Maps have become charged images in our ever-more visual world, codifying ideas and expectations about space, place, orientation and itinerary. “What is a map?” asks the map scholar and theorist Christian Jacob—and after famously spending 99 pages attempting a definition, he observes: “The map is a device that presents a new dimension, another degree of reality, within the field of vision. . . [it is] a widening of the visible field, of what can be thought and what can be uttered. It is also a space of anticipation, of predictability, of omniscience tied to the very fact of the synoptic gaze” (*The Sovereign Map*, 99). From this perspective, the term “map” usefully applies to a very wide range of objects from all over the world – as this seminar discovered, graphic organizers in classrooms are maps and so are the changing maps of the COVID pandemic; mappings of the self, like heart maps often used in elementary- and middle-school classrooms, coexist on a continuum with political maps which establish and contest territorial sovereignty. Maps have also existed across cultures in various forms, even though we (too often) assume that maps are a European invention in early modernity.

As the seminar traced the shifting intersections between cartographic technologies, social-political conflict, and literary form, we moved through themes in the history of cartography from the “cartographic revolution” of the sixteenth century to the grand digital-spatial dream of Google Earth. Participants grappled with the challenges of spatial literacy in verbal and visual texts, cartographic technologies and instruments, maps in books and as books (atlases), and textual uses of various mapping practices (spiritual, geographic, conceptual, data-driven). As the rich curriculum units designed by the participants show, we made ample use of online digital materials from the Beinecke Library, the David Rumsey Collection at Stanford, the Newberry Library, the British Library, and John Carter Brown Libraries.

The materials compiled in these units are wide-ranging—moving from mapping identities and the self through various literary texts to studying early twentieth-century genocides across the world and the history of African colonialism. Whatever their specific focus, each unit includes introductions to teaching with maps for various grades levels (seven through twelve), classroom exercises that teachers might use to integrate maps as thinking tools in their classrooms, and a variety of external resources that fellow teachers might draw on as they include maps in their pedagogy. It is worth noting the wide range

of subjects in which maps could be incorporated, and though the focus here is largely on language arts and social studies, each unit also has ideas for how teachers in adjacent topic areas might adapt their strategies. The first three units in this volume focus on language arts, while the final two focus on social studies and history; the order moves from middle through high school grades.

William Wagoner, “A Cartography of the Self: Making Meaning of the World through Life Maps” develops strategies in “personal cartography” by shaping a year-long “Atlas of Experience,” a portfolio project that gathers together a series of student-generated “life-maps” which visually map student goals, learning, and growth throughout the year. Anchored in a study of Sandra Cisneros’s *A House on Mango Street*, the unit focuses on mapping as an interdisciplinary tool that facilitates critical thinking across literature and social-emotional curricula.

Sean Griffin’s “Mapping the Life and Times of Phineas Gage” engages the use of maps *for* travel and as reflections *on* travel. It builds on the teaching of John Fleishman’s *Phineas Gage: A Gruesome, but True Story about Brain Science* to draw together writing, literature, history and biology through the use of mapping. Following the journey of Gage through various maps—railway maps, brain maps, timelines, maps about literature—helps students integrate various aspects of a complex narrative, while also giving them tools for their own travel writing projects.

Aron Meyer’s “Distance, Location, and Movement in *Sing, Unburied, Sing*” shows how mapping as visualization becomes a generative tool for teaching literary analysis. Tackling the challenge of teaching Jesmyn Ward’s complex narrative to twelfth-graders, this unit suggests how rendering abstract concepts and multifaceted relationships in the novel as maps can enable students to become more confident and sophisticated readers, particularly with regard to topics such as race, trauma, identity and social stratification.

Robert Schwartz’s unit, “A Modern Scramble: Envisioning Colonialism in Africa using Maps and Literary Critique” aims to use maps to combine literary and historical topics in a unit that focuses on the European colonization of Africa in the late nineteenth century. Beginning with the division of the African continent among colonizing nations by drawing political boundaries on a map at the Treaty of Berlin, students are introduced to the history and legacy of colonization through a series of historical maps. They then turn to excerpts from Joseph Conrad’s classic novella *Heart of Darkness*, itself inspired by maps, and to Chinua Achebe’s searing critique of the work’s racism.

Mark Osenko shows how maps—both existing historical ones and analytical/exploratory cartographies generated by students—can illuminate a difficult subject: “Mapping Genocides of the Early Twentieth Century.” Deploying a variety of mapping techniques—territorial, resource and census mapping, as well as mind and emotional

mapping—this unit develops strategies to help students learn about and critically reflect on global histories of genocide before the Holocaust.

Ayesha Ramachandran

Synopses of the Curriculum Units

21.03.01

A Cartography of the Self: Making Meaning of the World through Life Maps, by William Wagoner

This unit introduces the concept of a cartography of the self. That is, by using the techniques and tools of mapmaking applied to our personal lives and literary texts, we can develop a much more clear and relevant sense of both our own history, experiences, values, relationships, hopes, and fears, and those of characters we read about. The aim of this practice is to give teachers and students, through the creation of a series of Life-Maps, a deeper understanding of who they are, what they value, where they wish to go, and who they wish to become. Using "personal cartography" as a learning strategy gives teachers a rigorous, adaptable, visual and interdisciplinary tool that brings critical thinking engagement to literature and social - emotional growth and culminates in a yearlong "Atlas of Experience," a portfolio project visually mapping student goals, learning, and growth throughout the year.

(Developed for ELA, grades 7-8; recommended for ELA, Advisory, and Creative Writing, grades 7-12)

21.03.02

Mapping the Life and Times of Phineas Gage, by Sean Griffin

In this unit, I invite students to follow, map, and reflect on the travels of a nineteenth-century railway worker whose life was turned upside down after an accident with explosives left him with a serious brain injury. The main text in the unit is John Fleishman's book, *Phineas Gage: A Gruesome, but True Story about Brain Science* which has been used in the New Haven public school's language arts curriculum for a number of years. After a brief introduction to the realm of maps and travel writing, I invite students to create a persona that will become a travel writer and follow in the footsteps of Phineas Gage, reflecting on his physical and emotional journey. As we read the book, students will interact with a number of maps (including railway maps, brain maps, timelines, maps about literature, science and others) that will help them to interpret and breakdown a wide array of information that surrounds Phineas' story. My hopes are that students will not only utilize maps and writing to interpret and reflect on the life journey of Phineas Gage, but their work will also lead them to reflections on their own lives as travelers on a journey.

(Developed for Language Arts, grade 7; recommended for Language Arts, grade 8, Science, grades 7-8, and U. S. History, grade 9)

21.03.03

Distance, Location, and Movement in *Sing, Unburied, Sing*, by Aron Meyer

This unit introduces students to cartography as a strategy for facilitating comprehension of complex novels and literary elements. As an English teacher, I frequently use graphic organizers to help students arrange and understand material more clearly. At times, however, traditional organizers are inadequate for students to understand complicated, abstract literary concepts, particularly when using a challenging anchor text. This is where introducing mapping concepts can be especially useful.

The core novel I have selected for this unit, Jesmyn Ward's *Sing, Unburied, Sing*, features narrative and structural techniques that may be unfamiliar to students: alternating points of view, multiple timelines, and characters who inhabit different planes of existence from one another. While these components of the novel can be difficult, particularly for reluctant or developing readers, this unit is designed to build students' confidence and comprehension strategies by having them create maps that organize and visualize information from the text. By visually rendering complicated material and abstract concepts, students will become more confident readers, develop skills that can be applied to other difficult texts that they encounter, and be better prepared to make meaning of sophisticated material.

(Developed for English, grade 12; recommended for English, grade 12)

21.03.04

Mapping Genocides of the Early Twentieth Century, by Mark Osenko

The study of genocide has always been a major focus of study within many classrooms across the country. Keeping that in mind, the lessons within this unit set out not only to provide the teacher with materials, but to create a more enriched understanding of early twentieth century genocides to their students. In addition, the unit allows for students to foster a deeper understanding of events through mapping and critical thinking exercises. It is through the use of maps that students will be able to think about genocide on a deeper level, by creating a mind map of what someone who experienced genocide felt to creating a map of a town pre- and post- genocide. It is through these activities that students will be able to place themselves in the mindset of individuals impacted by genocide and make a deeper connection to the material as a result.

(Developed for Modern World History and Genocide Unit, grade 9; recommended for Geography, World History, and Genocide Unit, grades 9-12)

21.03.05

A Modern Scramble: Envisioning Colonialism in Africa using Maps and Literary Critique, by Robert Schwartz

This unit is designed to introduce parts of Africa's geography and history to students who may not be able to do so through experience, by using maps and literary critique. We will explore the merits of using maps for historical and literary study, as well as explore maps of our communities and even design maps of our own. From there, we will explore the history and maps of the Scramble for Africa, when several European nations colonized 90% of the continent, using a map to divide the land and resources between them. We will enhance our study using literature of the time period, specifically, *Heart of Darkness* by Joseph Conrad. However, we will not be engaging in a novel study. We will be regarding it as a marker of the time, but with a highly critical view using our own insight, and an essay by Chinua Achebe vilifying the novella as racist. Once our multi-media journey is finished, hopefully students will come away with a larger understanding of less familiar parts of the world, and where they fit into history and today.

(Developed for African American and Latinx History, grades 11-12; recommended for English and History, grades 11-12)

IV. The Earth's Greenhouse and Global Warming

Introduction

Climate change is one of the most pressing problems facing society. Educating the public is an important part of the solution to climate change as it encourages people to change their attitude and behavior. There are two major global processes that are critical to understanding the science of planetary warming. The first is the energy, or heat budget of the atmosphere, while the second is the controls on greenhouse gas concentrations in the atmosphere. This seminar for the Yale-New Haven Teachers Institute focused on the dynamics of these two global phenomena in order to provide teachers with an understanding of the science behind climate change to bring to their classrooms.

The individual units in this volume addressed a range of climate change topics. Two units focused on how carbon cycles around the Earth, while another focused on the energy cycle. A second pair of units covered how the changing climate will impact ecosystems. One unit looked at “the other CO₂ problem”, or ocean acidification. One unit took a closer look at the greenhouse gases and how they impact planetary warming. One Fellow used climate change as a way to reinforce math concepts in the classroom, while a final unit discussed potential health impacts of a changing climate.

The units covered a broad range of topics but all aimed to increase climate change literacy in our youth. Collectively we hope this knowledge will help move the earth to a more sustainable climate in the future.

Peter Raymond

Synopses of the Curriculum Units

21.04.01

The Impact of Ocean Acidification on Marine Ecosystems, by Somi Devi Akella

The main ideas behind this unit include (1) to introduce the concept of global warming, how it is caused, and its negative effects on the planet (2) to understand the process of the carbon cycle and trace the movement of carbon between the land, atmosphere, and the bodies of water such as the rivers and the oceans (3) to introduce the phenomenon of ocean acidification and understand how it negatively impacts the plants, animals, and the entire marine ecosystem, and (4) identify the practices that could be set in place to create awareness about how human activities such as the burning of the fossil fuels negatively impact the marine ecosystems. The activities included in this unit will help students understand the concepts thoroughly. This unit can be modified for students at middle-school and elementary-school levels. The content knowledge in this unit couples with the Next Generation Science Standards (NGSS) practices, such as asking questions, conducting research, collecting, analyzing, and interpreting data, finding answers to questions, and designing solutions. The unit thus addresses the New Haven Public School District, the State of Connecticut, and the Next Generation Science Standards (NGSS).

(Developed for Biology, grade 10; recommended for Biology, Environmental Science, Earth Science, and General Science, grades 9-12)

21.04.02

Budgeting for a Better Tomorrow, by Larissa Giordano

This unit will teach students about Ecosystems. They will begin by analyzing the four spheres: biosphere, hydrosphere, atmosphere, geosphere and how they are interconnected, understanding that one system cannot exist without the other in order to maintain proper functioning within our planet. Students will learn about the various types of ecosystems that exist and how living organisms depend on other living and non-living organisms for survival by examining how the spheres interact and how changes in one, affects another. Students will understand that ecosystems are fueled by the energy from the sun and cycles from which they are powered.

It will focus on what the carbon cycle is and its' influence in our lives. Carbon is essential for all life on Earth as it regulates the Earth's temperature and provides an essential source of the energy to fuel our economy. By gaining a deeper understanding of how carbon moves throughout the spheres, we can better regulate our daily decisions to help sustain our future.

Human activities, however, are altering the carbon cycle. Deforestation or land use can alter the amount of carbon in the atmosphere faster than it can be absorbed. They will

dissect human activity and understand how our actions today affect the carbon budget of tomorrow. They will understand that burning fossil fuels and land use greatly affects the amount of carbon in the atmosphere by conducting investigations and researching how to reduce human impact, consequently leading them to develop possible solutions.

(Developed for Science, grade 5; recommended for Science, grades 5 and 8, if lessons are enhanced to higher level)

21.04.03

Making mathematical sense of Global Warming 2, by Stacy Haines

This unit is designed to help middle school students develop an understanding of rates, ratios, proportions, percents; as well as proportional relationships, unit rates, slope, linear equations, and exponential equations; and to understand how to use their mathematical knowledge to interpret and understand global warming. Students will use math modeling to make predictions about the future of global warming.

The unit is written with the intent of investigating global warming, and then teaching math topics to help students analyze what they are learning. There is some incidental cross-curricular teaching of NGSS standards.

(Developed for Math, grades 7-8, and Pre-Algebra, grade 8; recommended for Math, grades 6-7, and Pre-Algebra and Algebra, grade 8)

21.04.04

The role of carbon dioxide in our changing climate, by Anna Newman

This unit will investigate the role of carbon dioxide in climate change. The first two lessons will focus on how carbon dioxide gets into the atmosphere. As part of learning about the carbon cycle, we will learn about additional ways that carbon enters the cycle through the burning of fossil fuels. Students will analyze graphs of carbon dioxide levels in the atmosphere over the last 200 or so years, identify patterns in the graphs, and make predictions about what will happen to carbon dioxide levels in the future if no changes are made to industry. Next, we will investigate how carbon dioxide and greenhouse gases increase the Earth's temperature. Through a simple experiment that models the greenhouse effect, students will develop a model that shows how the temperature of the earth has increased. Students will also analyze graphs of the temperature since the industrial revolution and make connections between the carbon dioxide levels and the temperature levels. The unit will then introduce the idea of climate sensitivity, a way to estimate the change in temperature due to increasing carbon dioxide levels. Finally, students will work in groups to develop a model of the role that carbon dioxide plays in climate change, using the content that they have learned about the carbon cycle, the effect of fossil fuels on the carbon cycle, and climate sensitivity models.

(Developed for Phy-Chem, grade 9; recommended for Physical Chemistry, Environmental Science, and Earth Science, grades 9-12)

21.04.05

Chemistry of Greenhouse Gases, by Michael Petrescu

Water vapor, carbon dioxide and some other gases present in the atmosphere in much smaller quantities absorb some of the thermal radiation leaving the surface, acting as a partial blanket for this radiation. This blanketing is known as the natural greenhouse effect and the gases are known as greenhouse gases. It is called 'natural' because almost all the atmospheric gases were there long before human beings came on the scene. The enhanced greenhouse effect, or global warming, is the added effect caused by the gases present in the atmosphere due to human activities such as the burning of fossil fuels and deforestation.

Greenhouse gases emitted by human activities alter Earth's energy balance and therefore, its climate. Humans also affect climate by changing the nature of the land surfaces and through the emission of pollutants that affect the amount and type of particles in the atmosphere.

Scientists have determined that, when all human and natural factors are considered, Earth's climate balance has been altered towards warming, with the biggest contributor being increases in carbon dioxide.

The purpose of this unit is to inform high school students about the three main greenhouse gases (carbon dioxide, methane and nitrous oxide). The unit will be a mix of organic and inorganic chemistry and will describe the physical and chemical properties of the three main gases and the most important chemical reactions that move the greenhouse gases into and out of the atmosphere. One section of the unit will discuss the "global warming potential" (what makes a stronger or a weaker greenhouse gas) and the balance between greenhouse gases.

This unit is intended to be taught in high school Chemistry and Physical Science classes. The unit can be used also by middle school 7th and 8th grade Science teachers to introduce students to concepts related to greenhouse gases and global warming. The unit requires about 12 class periods and will last approximately three weeks.

(Developed for Engineering, grade 8; recommended for Physical Science, Chemistry, and Environmental Science, grade 10)

21.04.06**Systems For Survival: The Effects of Climate Change in Connecticut, by Michelle Romanelli**

This eight lesson unit was designed to introduce elementary students to our constant changing world due to different variables like climate change, sea level rise, and the greenhouse effect. Specifically, students will be able to describe the environmental effects on a habit or ecosystem and various species from Connecticut. Additionally, students will be able to explain how different animals and species have reacted to challenges in their environment and ecosystem. Some of the specific animals that this unit will focus on are the saltmarsh sparrow and the marbled salamanders, New England lobsters and the product maple syrup.

Within the unit, students will also have the opportunity to research other species who may be thriving or dying in various areas like Connecticut, the East Coast or other areas of the United States of America. Within the unit there are hands on activities and field trips students opportunities. Ultimately, the goal of this unit is for students to find their voice and create change to help reduce climate change in their own communities. This campaign will help students alert the community with the challenges of climate change and sea level rise that are being faced in their surrounding neighborhoods.

(Developed for Science, Non Fiction Reading, and Non Fiction Writing, grade 4; recommended for Science, Non Fiction Reading, and Non Fiction Writing, grades 3 and 5)

21.04.07**Energy and a Changing Climate for English Language Learners, by Lianne Samalot**

This unit is written for teachers with climate change in their curriculum and English Language Learners in their classroom. Written to be taught at a large high school in New Haven CT with block scheduling, teachers may use this unit to inform themselves on climate change and for some ideas for labs that help demonstrate the science behind a warmer world. Also provided here are some general teaching strategies to help students learning English grasp the science and the English language.

Climate change is the major environmental issue of the day and we are already feeling the effects of a warmer world. Effects include but are not limited to more severe storms, floods, droughts and sea level rise. It is important for students to learn why this is happening and what caused it but also what can be done about it. All students deserve to learn about the changes to the world that directly impact them.

(Developed for PhyChem, grade 9; recommended for Climate Change, grades 9-12)

21.04.08

Synopsis for Understanding the Carbon Cycle and Climate Change in 4th Grade, by Jason Ward

The science of Earth's global climate system and the responsibilities that all humans share as protective caretakers of our planet are important for every person to understand. We all have a vested interest in our planet because Earth is our only home. People have been observing, questioning, and analyzing collected information about the history of the Earth ever since the earliest humans first wondered about the world around them. Learning from the past is a smart and logical way to prepare for the future.

This unit will help 4th or 5th grade teachers prepare students to explore two big questions related to the Earth's changing climate. The primary goal is to nurture an understanding of the element carbon, Earth's carbon cycle, and how carbon dioxide and other gases contribute to the planet warming greenhouse effect of Earth's atmosphere. The questions are:

- 1) What is carbon and why are all living things on Earth considered to be carbon-based lifeforms?
- 2) What is the greenhouse effect and why should we care about how much carbon is in our atmosphere?

These questions align with the Next Generation Science Standards (NGSS) for 4th grade that many states have adopted or adapted.

(Developed for Elementary Science, grade 4; recommended for Elementary Science, grade 4)

21.04.09

Sick Planet: The Link between Carbon, Climate Change, and Human Health, by Andrea Zullo

Climate change is an important topic to introduce to students of all ages. For many students, it is difficult to make the connection between climate and the direct impacts on their health. This unit aims to demonstrate the interconnection between disease and changes in local climates in Connecticut. There are several indicators of climate change that are explored including the increase in global temperature, changes to the first and last frost dates, impacts of sea surface temperature, and thawing of glaciers and permafrost. These climate change symptoms have caused expanded ranges of vectors for disease transmission, changes in allergy seasons, and increases in heat-related illnesses.

This unit is designed to be implemented whole or in part in a variety of courses including

physical-chemistry, chemistry, environmental science, biology, or anatomy courses. The suggested activities can also be adjusted to fit some middle school science curriculum and high school science curriculum.

(Developed for Anatomy, grades 11-12, and Biology, grade 10; recommended for Physics-Chemistry, grade 9; Biology, grade 10; Chemistry, grade 11; and Environmental Science electives)

**Curriculum Units by Fellows of the
Yale-New Haven Teachers Institute
1978-2021**

	2021	
Volume I		The Social Struggles of Contemporary Black Art
Volume II		Developing Anti-Racist Curriculum and Pedagogy
Volume III		How to Do Things with Maps
Volume IV		The Earth's Greenhouse and Global Warming
	2020	
Volume I		The Place of Woman: Home, Economy, and Politics
Volume II		Chemistry of Food and Cooking
	2019	
Volume I		Digital Lives
Volume II		Teaching about Race and Racism Across the Disciplines
Volume III		Human Centered Design of Biotechnology
	2018	
Volume I		An Introduction to Income Inequality in America: Economics, History, Law
Volume II		Engineering Solutions to 21st-Century Environmental Problems
	2017	
Volume I		Adapting Literature
Volume II		Watershed Science
	2016	
Volume I		Shakespeare and the Scenes of Instruction
Volume II		Literature and Identity
Volume III		Citizenship, Identity, and Democracy
Volume IV		Physical Science and Physical Chemistry
	2015	
Volume I		Teaching Native American Studies
Volume II		American Culture in the Long 20th Century
Volume III		Physics and Chemistry of the Earth's Atmosphere and Climate
Volume IV		Big Molecules, Big Problems

Curriculum Units by Fellows (continued)

2014

Volume I	Picture Writing
Volume II	Exploring Community through Ethnographic Nonfiction, Fiction, and Film
Volume III	Race and American Law, 1850-Present
Volume IV	Engineering in Biology, Health and Medicine

2013

Volume I	Literature and Information
Volume II	Immigration and Migration and the Making of a Modern American City
Volume III	Sustainability: Means or Ends?
Volume IV	Asking Questions in Biology: Discovery versus Knowledge

2012

Volume I	Understanding History and Society through Visual Art, 1776 to 1914
Volume II	The Art of Biography
Volume III	Anatomy, Health, and Disease: From the Skeletal System to Cardiovascular Fitness
Volume IV	Engineering in the K-12 Classroom: Math and Science Education for the 21st-Century Workforce

2011

Volume I	Writing with Words and Images
Volume II	What History Teaches
Volume III	The Sound of Words: An Introduction to Poetry
Volume IV	Energy, Environment, and Health

2010

Volume I	Interdisciplinary Approaches to Consumer Culture
Volume II	The Art of Reading People: Character, Expression, Interpretation
Volume III	Geomicrobiology: How Microbes Shape Our Planet
Volume IV	Renewable Energy

2009

Volume I	Writing, Knowing, Seeing
Volume II	The Modern World in Literature and the Arts
Volume III	Science and Engineering in the Kitchen
Volume IV	How We Learn about the Brain
Volume V	Evolutionary Medicine

Curriculum Units by Fellows (continued)

2008

Volume I	Controlling War by Law
Volume II	Storytelling: Fictional Narratives, Imaginary People, and the Reader's Real Life
Volume III	Pride of Place: New Haven Material and Visual Culture
Volume IV	Representations of Democracy in Literature, History and Film
Volume V	Forces of Nature: Using Earth and Planetary Science for Teaching Physical Science
Volume VI	Depicting and Analyzing Data: Enriching Science and Math Curricula through Graphical Displays and Mapping

2007

Volume I	American Voices: Listening to Fiction, Poetry, and Prose
Volume II	Voyages in World History before 1500
Volume III	The Physics, Astronomy and Mathematics of the Solar System
Volume IV	The Science of Natural Disasters
Volume V	Health and the Human Machine

2006

Volume I	Photographing America: A Cultural History, 1840-1970
Volume II	Latino Cultures and Communities
Volume III	Postwar America: 1945-1963
Volume IV	Math in the Beauty and Realization of Architecture
Volume V	Engineering in Modern Medicine
Volume VI	Anatomy and Art: How We See and Understand

2005

Volume I	Stories around the World in Film and Literature
Volume II	The Challenge of Intersecting Identities in American Society: Race/Ethnicity, Gender and Nation
Volume III	History in the American Landscape: Place, Memory, Poetry
Volume IV	The Sun and Its Effects on Earth
Volume V	Ecology and Biodiversity Conservation

Curriculum Units by Fellows (continued)

2004

Volume I	The Supreme Court in American Political History
Volume II	Children's Literature in the Classroom
Volume III	Representations of American Culture, 1760-1960: Art and Literature
Volume IV	Energy, Engines, and the Environment
Volume V	The Craft of Word Problems

2003

Volume I	Geography through Film and Literature
Volume II	Everyday Life in Early America
Volume III	Teaching Poetry in the Primary and Secondary Schools
Volume IV	Physics in Everyday Life
Volume V	Water in the 21st Century

2002

Volume I	Survival Stories
Volume II	Exploring the Middle East: Hands-On Approaches
Volume III	War and Peace in the Twentieth Century and Beyond
Volume IV	The Craft of Writing
Volume V	Food, Environmental Quality and Health
Volume VI	Biology and History of Ethnic Violence and Sexual Oppression

2001

Volume I	Medicine, Ethics and Law
Volume II	Art as Evidence: The Interpretation of Objects
Volume III	Reading and Writing Poetry
Volume IV	Race and Ethnicity in Contemporary American Art and Literature
Volume V	Bridges: Human Links and Innovations
Volume VI	Intelligence: Theories and Developmental Origins

Curriculum Units by Fellows (continued)

2000

Volume I	Women Writers in Latin America
Volume II	Crime and Punishment
Volume III	Constitutional and Statutory Privacy Protections in the 21st Century
Volume IV	Ethnicity and Dissent in American Literature and Art
Volume V	Sound and Sensibility: Acoustics in Architecture, Music, and the Environment
Volume VI	The Chemistry of Photosynthesis
Volume VII	Bioethics

1999

Volume I	Women's Voices in Fiction
Volume II	Art and Identity in Mexico, from the Olmec to Modern Times
Volume III	Immigration and American Life
Volume IV	Detective Fiction: Its Use as Literature and as History
Volume V	How Do You Know? The Experimental Basis of Chemical Knowledge
Volume VI	Human-Environment Relations: International Perspectives from History, Science, Politics, and Ethics
Volume VII	Electronics in the 20th Century: Nature, Technology, People, Companies, and the Marketplace

1998

Volume I	The Use and Abuse of History in Film and Video
Volume II	Cultures and Their Myths
Volume III	Art and Artifacts: The Cultural Meaning of Objects
Volume IV	American Political Thought
Volume V	Reading Across the Cultures
Volume VI	Selected Topics in Contemporary Astronomy and Space Science
Volume VII	The Population Explosion

1997

Volume I	Twentieth Century Latin American Writing
Volume II	American Children's Literature
Volume III	American Maid: Growing Up Female in Life and Literature
Volume IV	Student Diversity and Its Contribution to Their Learning
Volume V	The Blues Impulse
Volume VI	Global Change, Humans and the Coastal Ocean
Volume VII	Environmental Quality in the 21st Century

Curriculum Units by Fellows (continued)

1996

Volume I	Multiculturalism and the Law
Volume II	Environmental and Occupational Health: What We Know; How We Know; What We Can Do
Volume III	Race and Representation in American Cinema
Volume IV	Remaking America: Contemporary U.S. Immigration
Volume V	Genetics in the 21st Century: Destiny, Chance or Choice
Volume VI	Selected Topics in Astronomy and Space Studies

1995

Volume I	Gender, Race, and Milieu in Detective Fiction
Volume II	Film and Literature
Volume III	The Constitution and Criminal Justice
Volume IV	Coming of Age in Ethnic America
Volume V	The Geological Environment of Connecticut

1994

Volume I	Family Law, Family Lives: New View of Parents, Children and the State
Volume II	Poetry in the Classroom: Incentive and Dramatization
Volume III	Understanding the Ancient Americas: Foundation, Flourishing, and Survival
Volume IV	Racism and Nativism in American Political Culture
Volume V	The Atmosphere and the Ocean

1993

Volume I	The Symbolic Language of Architecture and Public Monuments
Volume II	Folktales
Volume III	Twentieth-Century Multicultural Theater
Volume IV	The Minority Artist in America
Volume V	Environmental Science

1992

Volume I	The Constitution, Courts and Public Schools
Volume II	Writing and Re-writings of the Discovery and Conquest of America
Volume III	Reading and Writing the City
Volume IV	The National Experience: American Art and Culture
Volume V	Ecosystems: Tools for Science and Math Teachers

Curriculum Units by Fellows (continued)

1991

- Volume I Regions and Regionalism in the United States: Studies in the History and Cultures of the South, The Northeast and the American Southwest
- Volume II The Family in Art and Material Culture
- Volume III Afro-American Autobiography
- Volume IV Recent American Poetry: Expanding the Canon
- Volume V Adolescence/Adolescents' Health
- Volume VI Global Change

1990

- Volume I The Autobiographical Mode in Latin American Literature
- Volume II Contemporary American Drama: Scripts and Performance
- Volume III The U.S. National Parks Movement
- Volume IV American Family Portraits (Section I)
- Volume V American Family Portraits (Section II)
- Volume VI Genetics
- Volume VII What Makes Airplanes Fly? History, Science and Applications of Aerodynamics

1989

- Volume I American Communities, 1880-1980
- Volume II Poetry
- Volume III Family Ties in Latin American Fiction
- Volume IV Detective Fiction: Its Use as Literature and History
- Volume V America as Myth
- Volume VI Crystals in Science, Math, and Technology
- Volume VII Electricity

1988

- Volume I The Constitution in Public Schools
- Volume II Immigrants and American Identity
- Volume III Autobiography in America
- Volume IV Responding to American Words and Images
- Volume V Hormones and Reproduction
- Volume VI An Introduction to Aerodynamics

Curriculum Units by Fellows (continued)

1987

Volume I	The Modern Short Story in Latin America
Volume II	Epic, Romance and the American Dream
Volume III	Writing About American Culture
Volume IV	The Writing of History: History as Literature
Volume V	Human Nature, Biology, and Social Structure: A Critical Look at What Science Can Tell Us About Society
Volume VI	Science, Technology, and Society

1986

Volume I	The Family in Literature
Volume II	Writings and Re-Writings of the Discovery and Conquest of America
Volume III	Topics in Western Civilization: Ideals of Community and the Development of Urban Life, 1250-1700
Volume IV	The Process of Writing
Volume V	The Measurement of Adolescents, II
Volume VI	Fossil Fuels: Occurrence; Production; Use; Impacts on Air Quality

1985

Volume I	Poetry
Volume II	American Musical Theater
Volume III	Twentieth Century American Fiction, Biography, and Autobiography
Volume IV	History as Fiction in Central and South America
Volume V	Odysseys: Nineteenth and Twentieth-Century African-American History Through Personal Narrative
Volume VI	Time Machines: Artifacts and Culture
Volume VII	Skeletal Materials-Biomineralization
Volume VIII	The Measurement of Adolescents

1984

Volume I	Elements of Architecture, Part II
Volume II	Greek Civilization
Volume III	Hispanic Minorities in the United States
Volume IV	The Oral Tradition
Volume V	American Adolescents in the Public Eye
Volume VI	Geology and the Industrial History of Connecticut

Curriculum Units by Fellows (continued)

1983

Volume I	Elements of Architecture
Volume II	Greek and Roman Mythology
Volume III	Reading the Twentieth Century Short Story
Volume IV	America in the Sixties: Culture and Counter-Culture
Volume V	Drama
Volume VI	Cross-Cultural Variation in Children and Families
Volume VII	Medical Imaging

1982

Volume I	Society and the Detective Novel
Volume II	Autobiography
Volume III	The Constitution in American History
Volume IV	An Unstable World: The West in Decline?
Volume V	Society and Literature in Latin America
Volume VI	The Changing American Family: Historical and Comparative Perspectives
Volume VII	Human Fetal Development

1981

Volume I	The "City" in American Literature and Culture
Volume II	An Interdisciplinary Approach to British Studies
Volume III	Human Sexuality and Human Society
Volume IV	Writing Across the Curriculum
Volume V	The Human Environment: Energy
Volume VI	Computing

1980

Volume I	Adolescence and Narrative: Strategies for Teaching Fiction
Volume II	Art, Artifacts, and Material Culture
Volume III	Drama
Volume IV	Language and Writing
Volume V	Man and the Environment
Volume VI	The Present as History
Volume VII	Problem Solving

Curriculum Units by Fellows (continued)

1979

Volume I	The Stranger and Modern Fiction: A Portrait in Black and White
Volume II	Themes in Twentieth Century American Culture
Volume III	Remarkable City: Industrial New Haven and the Nation, 1800-1900
Volume IV	Language and Writing
Volume V	Strategies for Teaching Literature
Volume VI	Natural History and Biology

1978

Volume I	Language and Writing
Volume II	20th Century Afro-American Culture
Volume III	20th Century American History and Literature
Volume IV	Colonial American History and Material Culture