



YALE NATIONAL INITIATIVE

to strengthen teaching in public schools®

Curriculum Units by Fellows of the National Initiative

2023 Volume III: Transitions in the Conception of Number: From Whole Numbers to Rational Numbers to Algebra

Preface

Transitions in the Conception of Number: From Whole Numbers to Rational Numbers to Algebra

In March 2023 the Yale National Initiative to strengthen teaching in public schools® accepted teachers from fourteen public school districts in nine states to participate in five national seminars led by Yale University faculty members. The Initiative is a long-term endeavor to influence public policy on teacher professional development, in part by establishing exemplary Teachers Institutes for high-need schools in states around the country.

Teachers Institutes are educational partnerships between universities and school districts designed to strengthen teaching and learning in a community's high-poverty, high-minority public schools. 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.

Twenty-eight of the teachers, named Yale National Fellows, were from school districts that are planning, restoring, or exploring the establishment of a new Teachers Institute for Chicago, IL; Pittsburgh, PA; Richmond, VA; San José, CA; Tulsa, OK; and locations in Texas. Other National Fellows came from existing Teachers Institutes located on the Navajo Nation, AZ; and in New Castle County, DE; New Haven, CT; and Philadelphia, PA. Overall, half of the National Fellows are participating in national seminars for the first time.

The National Fellows attended an Organizational Session of the seminars held at Yale on May 5-6. The seminars reconvened on campus during a ten-day Intensive Session from July 10-21 and concluded in mid-August when the Fellows submitted their completed curriculum units. The five seminars were:

- “Histories of Art, Race and Empire: 1492-1865,” led by Timothy Barringer, Paul Mellon Professor in the History of Art;
- “Writing About Nature,” led by Jill Campbell, Professor of English;
- “Transitions in the Conception of Number: From Whole Numbers to Rational Numbers to Algebra,” led by Roger Howe, William R. Kenan, Jr. Professor Emeritus of Mathematics;
- “Environmental Justice,” led by Jordan Peccia, Thomas E. Golden, Jr. Professor of Environmental Engineering; and
- “Nature-Inspired Solutions to Disease Problems,” led by Paul Turner, Rachel Carson Professor of Ecology and Evolutionary Biology.

The purposes of the program are to provide public school teachers deeper knowledge of the subjects they

teach and first-hand experience with the Teachers Institute approach to high-quality professional development. This reinforces their leadership in an existing Teachers Institute or prepares them to lead the development of a new Teachers Institute. Each teacher writes a curriculum unit to teach their students about the seminar subject and to share with other teachers in their school district and, through our website at teachers.yale.edu, with teachers anywhere. The curriculum units contain five elements: content objectives, teaching strategies, examples of classroom activities, lists of resources for teachers and students, and an appendix on the district academic standards the unit implements. In these ways the curriculum units assist teachers in engaging and educating the students in their school courses.

The curriculum units National Fellows wrote are their own; they are presented in five volumes, one for each seminar. We encourage teachers who use the units to submit comments online.

The Yale-New Haven Teachers Institute® is a permanently endowed academic unit of Yale University, which undertook the National Initiative in 2004.

James R. Vivian

New Haven

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