



Curriculum Units by Fellows of the Yale-New Haven Teachers Institute  
2019 Volume III: Human Centered Design of Biotechnology

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## Introduction

Over a 13-week period, educators throughout the New Haven public school system engaged in a series of seminars that addressed the topic of Human-Centered Design of Biotechnology. The goal of the seminar series was to engage educators in discussions of innovations that lead to the development of medical advancement, why the focus on human factors are key to any technology's success, and how novel methods in engineering and design can be used to create accessible, affordable, and appropriate medical and health-based technologies. In short, teachers were engaged in exploring and understanding the best practices in human centered design of biotechnology.

As engineers and scientists move towards advanced design of biomedical devices, diagnostics tools and therapeutic solutions, we often lose sight of the ultimate goal of improving the overall human condition. By evaluating biotechnological advancements that are enhancing the quality of life in the U. S. and abroad, teachers in the Yale-New Haven Teachers Institute studied the most pressing concerns in global health today as well as the challenges expected in the next 10+ years. Teachers engaged with the content on this topic by accessing literature from popular press and primary scientific journals, each using the acquired knowledge for the development of a curriculum unit appropriate for kindergarten through high school students. Impressively, but not surprisingly, each teacher was able to engage the content of the seminar in a way that uniquely supports their students' social and academic developmental stage.

Throughout the series of seminars teachers were interactively engaged with the design thinking method. In the curriculum units that follow, you will see that Jason Ward uses this methodology as a way to engage students in active problem solving. These methods were also used as activities within curriculum units that focused on specific health related issues. The units of Terry Bella and Somi Akella are focused on vaccines, their history of development and next steps in technology. Additionally, the unit developed by Madisen Swallow is specifically designed to engage students on the topic of skin health, disease, prevention and diagnosis. Delving deeper into the overall context of human engagement with biotechnology, Aparna Shyam and Simisola Aromolaran each developed curriculum units that beautifully teach basic concepts of statistics and economics, respectively. However, they do so within the context of gene editing and public access to health care. With a focus on human implications of advances in chemistry and biochemistry, Nicholas Farrell and Michael Petrescu created units that help students engage the fundamentals of science and considerations of drug development and tissue engineering. Perhaps the most personal and human empathizing units were developed by Rosalba Zajac and Jessica Smith, who each created units of human access to and use of biotechnology in the context of The American Disabilities Act and those in need of personalized health care. Finally, Carol Boynton demonstrates in her curriculum that engineering and design are concepts that can aid

K-2nd grade students to have an understanding of their own body and how it functions as a refined machine.

These educators dedicated 13-weeks of their time and energy to an advanced learning of topics across the spectrum of design, manufacturing, testing and commercialization of medical technologies. The curriculum units developed have helped me gain insight into the New Haven Public School system itself, as well as the brilliance and dedications of the teachers within this system.

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