



Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
2025 Volume I: Objects, Material Culture, and Empire: Making Russia

Beakers and Behavior: The Material Culture of the Science Laboratory

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This interdisciplinary unit introduces high school students to the laboratory setting through the lens of material culture, using laboratory tools as entry points for scientific inquiry, cultural reflection, and behavioral expectations. Designed as an introductory unit for science courses like Chemistry and Integrated Science, it invites students to explore the physical and chemical properties of materials and how these properties shape scientific practices, safety norms, and classroom conduct. Students will learn to think like scientists by developing foundational skills in measurement, SI units, and unit conversions, connecting abstract concepts to the tools and technologies they handle in class. Lab equipment will be treated as cultural artifacts whose design and material properties influence what scientists can do, and how they must behave, in the laboratory.

By treating laboratory objects like goggles, beakers, and hot plates as cultural artifacts with agency, students begin to understand how material design influences what we can do in a lab and how we behave within it. Historical and artistic representations of laboratories further enrich students' understanding of how science is both practiced and perceived. Through hands-on experiments, critical observation, and reflective discussion, students will examine how the evolution of scientific tools parallels advancements in chemistry, while also developing foundational concepts such as heat transfer, energy, and states of matter. Aligned with the Next Generation Science Standards (NGSS), this unit not only builds content knowledge but also cultivates scientific identity and lab

citizenship, helping students “think like scientists” from day one by recognizing the lab as a place of careful practice, cultural meaning, and material constraint. By rooting this learning in the diverse lived experiences of our urban comprehensive high school students, I aim to make the laboratory not only a site for scientific thinking, but also a space for belonging, collaboration, and mutual respect.

(Developed for Chemistry, grades 10-12; Culinary Chemistry, grades 11-12; and Integrated Science, grade 9; recommended for Biology, General and Physical Sciences, Earth Science, and Art History, grades 9-12)

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