

Teaching Unit Introduction

Topic: Plastics and Environmental Health: Using environmental history to investigate challenges posed by low-level toxic chemicals

Rationale: New technologies and methods for the detection of toxics, particularly endocrine disruptors released by plastics, have drawn increasing attention toward the pervasive and persistent presence of synthetic chemicals in our lives. Some of these tests, such as biomonitoring and body burden analyses, highlight that we not only experience our environment in very obvious ways, but that we are also united with it at the molecular level. Trace chemicals found in the air, water, and soil are now being detected *within* us. The very chemical composition of our bodies is being altered in ways that reflect the transformations of our everyday environments. These teaching units will help students use the tools of environmental history to investigate the challenges posed by new synthetic chemicals, focusing on the case study of toxic chemicals in plastics, including bisphenol A, PVC, and phthalates.

Overview: This module offers a series of lessons to incorporate into a broader curriculum on U.S. history and historical investigation. The first unit is designed for a general undergraduate audience. This unit could be adapted for higher level courses by going into greater depth with the additional resources provided, using the reinforcement activities, and including advanced independent research projects. The second unit has been modified to meet the Wisconsin State Learning Standards for History and Environmental Education for grades 9-12. Although there are a number of national standards, we have chosen Wisconsin's as an example to use in this teaching unit. The high school and undergraduate units rely on many of the same sources but assignments have been tailored to fit the appropriate student level.

Each unit contains four lessons. Each lesson is comprised of 2-4 activities that help students achieve the lesson's understanding goals. Activities may take up an entire class period or be limited to 10-15 minute exercises. Activities can also be skipped or extended depending on the discretion of the teacher. Additional reinforcement activities are also provided to allow deeper exploration of certain topics and themes. These reinforcement activities are listed at the end of each lesson. Lessons may take more than one class period to complete and should be adapted to fit students' needs and school schedules.

Lesson Sequence: The lessons follow a loose chronological order. The first lesson explores the economic, cultural, and political factors that caused plastic to become a significant part of American society in the postwar era. It also examines concerns about the potential effects of new synthetic chemicals that emerged in the 1950s and '60s. The second lesson helps connect debates over the potential effects of chemicals associated with plastics to the broader environmental, public and consumer health movements of the 1960s and '70s. The lesson also looks at issues of how risk, uncertainty, and new knowledge about chemicals evolved. Lesson three uses the controversy around PVC as a case study and explores questions about regulation and research validity regarding potential threats to environmental and human health. Building on themes raised in the

first two lessons, students will consider the question of how do people know what they know? What is the role of science in political decision-making? In the fourth lesson, students will engage in a hearing about the regulation of bisphenol-A, a chemical found in polycarbonate plastic. In April 2008, Senator Charles E. Schumer introduced national legislation to ban bisphenol-A in consumer products—particularly in children’s goods. This lesson will encourage students to make connections between ideas and themes from previous lessons and apply these ideas to the contemporary debate over bisphenol-A.

Teaching Approach: The units take an inquiry-based approach to historical investigation. The purpose of this approach is to help students learn to generate researchable questions, create testable hypotheses, assess and evaluate evidence, and to think critically about how knowledge is created. Lessons do not lead students through a linear chain of calculated steps to achieve a particular answer. Instead, they pose important questions to students, expose them to a wide range of primary sources that offer different perspectives, and help them generate deeper understandings of the historical context of the issue and how these issues affect our world today. Collaborative discussions and activities as well as independent assignments will enable students to revise and add to their initial understandings. By analyzing a wide array of evidence and assessing the different perspectives offered by their peers, students will learn to think critically about their own ideas and to generate conclusions based on the best explanation of the issue in question. The purpose of this approach is to help students become effective future problem-solvers.

Preparation: Lessons involve independent work, small group activities, and large group discussion. Occasionally, the teacher will provide background knowledge on specified topics and should be familiar with the material in the background information section of each lesson. There are also additional resources listed at the end of each lesson where teachers can go for more information on the subject. Documents used for primary analysis can be downloaded directly off this site. Teachers can click on the links and print out copies of the documents for students to use in class.

Assessment: Students will be graded on their participation in class discussions and activities. Homework will be graded on the amount of time and thought they put into the assignment. For both in-class and out-of-class activities, students will be assessed on how well they support their ideas and make connections between activities.