

Lesson 4: Exploring the Future History of Plastics: Contemporary Debates about Bisphenol-A and Phthalates

Understanding Goals:

In this lesson, students will:

- Analyze current controversies over the regulation of bisphenol-A.
- Make connections between current issues and debates and themes discussed in previous lessons.

Lesson Overview:

In the first three lessons, students learned how and why synthetic chemicals became such a pervasive part of American life. They considered how different perspectives developed different understandings of the effects of synthetic chemicals on human and environmental health. Activities also helped students understand the complexity of regulating synthetic chemicals. In this final lesson, students will grapple with questions about risk and uncertainty by engaging in a case study about the regulation of bisphenol-A and phthalates.

Background:

Since the 1950s, bisphenol-A and a number of phthalates have become ubiquitous in the environment and in our bodies. Though it was invented in the nineteenth century, the mass-production of bisphenol-A began after WWII as a component of polycarbonate plastic—an especially lightweight, durable, and clear type of plastic. It has been used to make everything from food and drink containers, to car parts, to digital media and electronics. Phthalates have also become ubiquitous in a wide array of everyday products. Phthalates are a set of compounds that are added to plastic and vinyl to make materials more pliable. They are also a primary ingredient of many personal care products. In 1972, scientists discovered phthalates in human blood. In October 2007, the US Centers for Disease Control and Prevention (CDC) found that 93% of a random sample of 2,517 people had bisphenol-A in their urine.

Independent studies have linked these chemicals with endocrine disruption and are currently looking into the relationship between these chemicals and cancer, obesity, and hyperactivity. Other studies, funded primarily by the chemical industry, have found no causal link between bisphenol-A and phthalates and these deleterious effects. Some states taken action to regulate these chemicals. California, Minnesota, Washington and Maryland have all proposed legislation to regulate phthalates. On Friday, April 18, 2008 Senator Charles E. Schumer (D-NY) reported that he was going to introduce legislation to ban the use of bisphenol-A in all children’s products and “food contact” consumer products—including water bottles and food containers. This proposed legislation is central to the main activity in this lesson: a hearing about whether or not the federal government should ban the use of bisphenol-A and phthalates in all consumer products.

Preparation:

Teachers should be familiar with the contemporary debates about bisphenol-A and phthalates by exploring the links in the Perspectives Section. This lesson also requires that student pairs have access to the internet. In addition to copies of documents listed below, students will use on-line sources to build and refine their arguments. This will ideally be done in a computer lab, or encourage students to bring laptops to class if they have them.

Activity 4.1: Ban Bisphenol-A?: Exploring a Contemporary Debate

In his activity, students will make arguments for or against the banning of bisphenol-A, or for alternative measures, by drawing on a variety of ideas and sources. Working in pairs, students will assume the identities of different perspectives including the American Chemistry Council, a European risk expert, health scientists, a historian, investigative journalists, an expecting parent, and others. Pairs will be given some primary documents to work with and links to additional resources to draw from. They will spend half the class period developing their argument and will also investigating counter-arguments by exploring other links. Teachers should encourage creative, but sound arguments.

In addition to the student pairs, three students will be selected to serve as the hearings' Executive Committee. They will ultimately decide the outcome of the hearing. As others are building their cases during the first half of the course, the Executive Committee will familiarize themselves with as many perspectives as possible—though not to the same level of depth as the other groups. The Executive Committee will be responsible for running the hearings and being as fair and responsible to each party.

The second half of the class period will be devoted to the hearing itself. To begin, each pair will have 2 minutes to make their opening statement, including their stance on the proposed legislation and an explanation of this opinion. Then each group will have 2-3 minutes to explain their criticism of other group's perspectives. Following the critique, there will be an open session moderated by the Executive Committee. The Committee should be prepared to ask questions or call on representatives to clarify certain points. At the end of the hearing, the Executive Committee will determine the course of future action.

Perspectives for Activity 4.1:

1. Anna Soto, M.D., Professor of Cell, Molecular and Developmental Biology, Tufts University
Background Material: Testimony before Senate Health and Human Services Committee and Assembly Health Committee, Joint Informational Hearing on Breast Cancer and the Environment, October 23, 2002.
2. Steven Hentges, Ph.D., Executive Director, Polycarbonate/BPA Global Group, American Chemistry Council
Background Material: "Bisphenol-A Fact Sheet." Also see <http://www.bisphenol-a.org>.
3. Bill Durodie, Centre for Risk Management, King's College London, also New College, University of Oxford
Background Material: Bill Durodie, "The True Cost of Precautionary Chemical Regulation," *Risk Analysis*, Vol. 23, No. 2, 2003.
4. Susanne Rust, Meg Kissinger, and Cary Spivak, Investigative Journalists for the *Milwaukee Journal*
Background Material: "WARNING: The chemical bisphenol A has been known to pose severe health risks to laboratory animals. AND THE CHEMICAL IS IN YOU," *Milwaukee Journal Sentinel*, December 2, 2007. <http://www.jsonline.com/story/index.aspx?id=692145&format=print>

5. National Toxicology Program, Center for the Evaluation of Risks to Human Reproduction (CERHR)
Background Material: “NTP Draft Brief on Bisphenol-A,” April 2008
<http://cerhr.niehs.nih.gov/chemicals/bisphenol/bisphenol-eval.html>.
 Also see information on various phthalates: <http://cerhr.niehs.nih.gov/reports/index.html>.
6. Fred vom Saal, PhD, Developmental Biologist, University of Missouri.
Background Material: Liza Gross, “The Toxic Origins of Disease,” PLoS Biol 5(7): e193.
7. Sarah Vogel, MPH, MEM, Ph.D., Historian, Columbia University
Background Material: “Battles over Bisphenol-A,” GWU's Scientific Knowledge and Public Policy website, http://www.defending-science.org/case_studies/Battles-Over-Bisphenol-A.cfm
8. Hon. Andrew von Eschenbach, M.D., Commissioner, U.S. Food and Drug Administration
Background Material: Response to Committee on Energy and Commerce’s investigation about health effects of Bisphenol-A, http://energycommerce.house.gov/Press_110/110nr179.shtml;
<http://energycommerce.house.gov/Investigations/Bisphenol.shtml>
9. Hon. John D. Dingell, Chairman on Committee on Energy and Commerce & Bart Stupak, Chairman of the Subcommittee on Oversight and Investigations, House of Representatives.
Background Material: <http://energycommerce.house.gov/Investigations/Bisphenol.shtml>;
<http://www.sciam.com/article.cfm?id=plastic-not-fantastic-with-bisphenol-a&print=true>
10. Royal Society of Chemistry, London
Background Material:
<http://www.rsc.org/chemistryworld/Issues/2008/April/BisphenolABabyBottleDebate.asp>
11. Expecting Parent
Background Material: Shanna Swan, “Parents needn't wait for legislation to shield kids from toxins in products,” *San Francisco Chronicle*, January 9, 2006, <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2006/01/09/EDGMKGJGL61.DTL>;
 “Toxic Baby Bottles?” *Parenting Magazine*,
<http://www.parenting.com/article/Baby/Feeding/Toxic-Baby-Bottles>

Activity 4.2: Homework Assignment: Reflections on the Precautionary Principle

For this activity, students will need access to an internet connection. They will explore the Environmental Working Group’s Skin Deep: Cosmetic Safety Database site to check the toxicity of certain products that they use on a regular basis. The EWG website allows users to search specific products—everything from deodorant and toothpaste to nail polish and hair gel—to assess how hazardous they may be to users’ health.

To begin, have students write a list of personal care products that they used in the last 24 hours. The list should be as specific as possible, including brand names, particular scents or flavors, etc. Using the EWG website, students should search their products and write down each product’s “hazard score.” For the highest scoring product, have students click on the product and gather information on why the product received its score. The homework worksheet “Analyzing the Skin Deep: Cosmetic Safety Database” will help guide students through an evaluation of the website. It also introduces them to the precautionary principle and asks students to write a short reflection essay about whether

or not, on a smaller scale, they would apply the principle to their own decisions. That is, will they keep using the certain products once they know that they may be hazardous? Why or why not? The worksheet is provided below.

6. Look at the Government, Industry, Academic Studies, and Classifications section. Has this ingredient been classified in any surprising ways? Explain.

7. Go to the FAQ section of the Skin Deep site (there is a link to this section in the top right-hand corner). Explore some of EWG's answers to questions about how these "hazard scores" are calculated. Do you trust this source? Why or why not?

8. In January 1998, a group of scientists, academics, and activists gathered at the Wingspread Conference Center in Racine, WI. Together, they drafted the Wingspread Precautionary Principle which states that:

"Where an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically."

Write a short write a short reflection essay about whether or not, on a smaller scale, you would apply this principle in your own decisions about the products you just learned about. That is, will you keep using products that may be potentially hazardous? Why or why not? Use issues and ideas we have discussed in the past few lessons to explain your answer.