Lesson Three: The PVC Story: Exploring Responses, Regulation, and Research Validity

Understanding Goals:
In this lesson, students will:

- Learn how different interests develop knowledge and approach decision-making in regards to toxic chemicals
- Consider different historical perspectives on what constitutes 'sound science' and its role in regulating potentially toxic chemicals

Lesson Overview:
This lesson helps students understand how knowledge about toxic chemicals was created, used, and framed in different arguments for and against the regulation of polyvinyl chloride (PVC). Students will examine how competing claims about the possible risks to health played out in debates about the regulation of PVC. By exploring different perspectives, students will gain a better understanding of why different interests—activists, scientists, industry representatives, workers—developed different interpretations of the same phenomenon.

This lesson will also provide opportunities for students to understand how historians evaluate the reliability and effectiveness of primary sources. Activities will also help students understand how historical knowledge is used in contemporary debates.

Background Information:
Controversy over the health effects of PVC grew during the 1970s as the deaths of workers in different chemical plants were linked to the carcinogenic properties of a PVC monomer. During the beginning stages of the controversy, because there was so little known about the effects of new synthetic chemicals, it was difficult to make claims that PVC caused cancer. Scientists, workers, industry representatives, and the press attributed causality and approached regulation in different ways. These different understandings lay at the heart of debates over how to regulate PVC.

In 2002, historians Gerald Markowitz and David Rosner published *Deceit and Denial: The Deadly Politics of Industrial Pollution.* Two chapters of the book explain how the chemical industry tried to hide and distort studies that proved that the vinyl chloride monomer was carcinogenic. The authors relied on evidence gathered as a result of legal proceedings against the industry. A lawyer from Lake Charles, Louisiana named Billy Baggett, Jr. had collected a warehouse full of internal memos, meeting minutes, and correspondence produced by the Manufacturing Chemists Association. These documents not only helped produce *Deceit and Denial*, but they were also used in a 2001 Bill Moyers' Special Report called *Trade Secrets* and a 2002 documentary by Judith Helfand and Dan Gold called *Blue Vinyl*. Many of the documents can be accessed at the Chemical Industry Archives at the link listed in the Additional Resources section of this lesson.

In response to the media attention received by these productions, the chemical industry has criticized all three for misrepresenting evidence and distorting the truth. They claim that these liberal media sources are sensationalizing the issue and playing on people's preconceived notions of the chemical industry. After analyzing some of the same primary documents used in these productions, student will have a chance to draw their own conclusions. Then they will compare their ideas with the historians, the filmmakers, and their critics.

Activity 3.1: Analyzing Causes for Concern
Using primary sources, students will analyze a range of documents to gain a deeper understanding of how different perspectives—scientists, chemical industry executives, and chemical workers and their families—understood the effects of chemicals. Students will break up into small groups of three people. Each group will get a copy of all three documents listed below. Each student will analyze a different document and answer the questions listed below. When all group members finish their analyses, they will report to their small group.

Documents for Activity 3.1:

A. P.L. Viola, et al. "Oncogenic Response of Rat Skin, Lungs, and Bones to Vinyl Chloride," *Cancer Research,* 31, 516-522, May 1971.
B. Letter from R.N. Wheeler, jr. (Union Carbide) to J.L. Carvajal, et al. May 31, 1973.Confidential Correspondence between Members of the Manufacturing Chemists Association from Trade Secrets, industry archives
C. Victor Cohn, "Plastics Found in Bloodstreams," *Washington Post,* January 18, 1972.
D. Mikie Sherman, "Goodrich Employee Dies of Cancer-Linked Death," *Elyria (Ohio) Chronicle-Telegram,* November 3, 1975.

Questions:

1. Who was the author(s) of this document? What do you know about the author(s)?
2. Who was the intended audience of this document?
3. Why do you think this document was created? What evidence does the document contain that makes you think it was produced for that reason? Please refer to specific quotes from the document.
4. What does the document say about the potential affects PVC on human health?
5. List three questions that are left unanswered by the document.

After each student reports to the small group, students should compare the different perspectives. Ask the small groups to consider how each author would address questions about regulating potentially harmful chemicals. Have students explain to each other what kinds of measures that they think P.L. Viola, the Italian scientist; R.L. Wheeler, Jr., the Union Carbide executive; and Valerie Arthur the deceased worker's 15 year-old-daughter would advocate for in dealing with the PVC issue. Why do students think the different perspectives would be likely to take those actions? How do their decisions relate to the principles behind the Delaney Clause?

Activity 3.2: Comparing Interpretations
After the small group discussion, reconvene as a class. Have the students reflect on their own interpretations of the PVC controversy and compare it what they read in *Deceit and Denial*. Specifically, on page 178, Gerald Markowitz and David Rosner write that the chemical industry successfully deceived its workers and the public by "hiding its information about cancer from the government" and "deflecting national attention away from the potential hazards of thousands of mostly untested new chemicals and of vinyl chloride in particular." Do you agree with the historians' interpretation? Why or why not?

Depending on time and availability, the teacher may want to show students excerpts from Bill Moyers' *Trade Secrets* and/or Judith Helfand's *Blue Vinyl*. Moyers and Helfand come to similar conclusions as Markowitz and Rosner; namely, that the chemical companies withheld information about the risks of PVC to workers, surrounding communities, and the general public. Have students compare their own understandings to these additional sources. Do they agree with the central claims

of these documentaries? What questions do they have for the filmmakers? What are the strengths of these documentaries? What are their weaknesses?

Activity 3.3: Knowledge on Trial: Evaluating Criticism and Debating Research Validity
Like the *Trade Secrets* and *Blue Vinyl* documentaries, the publication of *Deceit and Denial* generated controversy and has had important legal impacts. In 2005, Markowitz was to serve as an expert witness in a trial in Mississippi where a chemical worker was planning to sue his former employer for knowingly exposing him to the polyvinyl chloride monomer that gave him cancer. In response to Markowitz's subpeona, the chemical industry hired lawyers and a professor from Rutgers University named Philip Scranton to discredit his research.

Have students read Jon Weiner's article in *The Nation* that appeared on February 7, 2005. Then divide the class in half. Give one group copies of Scranton's criticism of *Deceit and Denial*; give the other half Markowitz and Rosner's rebuttal. These reports are both fairly long so instead of having students thoroughly read them cover-to-cover, they should browse the main points of each memo. After students have a chance to read and discuss their documents, they should be prepared to debate the other half of the class. They can draw from the text of the documents provided below as well as other sources.

The debate will focus on the following questions: Is Markowitz and Rosner's research valid? Should Markowitz be allowed to provide testimony in the lawsuit against the chemical company?

Documents for Activity 3.3:

A. Jon Weiner, "Cancer, Chemicals, and History," *The Nation*, February 7, 2005.
B. Dr. Philip Scranton, Critique of *Deceit and Denial*, for *Douglas M. Spann, et al. v. Airco, Inc., et al*., United States District Court for the District of Mississippi, Jackson Division, Case No. 3:02-CV-1645WS, August 3, 2004.
C. David Rosner and Gerald Markowitz, "Response to Philip Scranton's Report on *Deceit and Denial: The Deadly Politics of Industrial Pollution*."

Activity 3.3: Homework Assignment:
Finish reading *Deceit and Denial*, Chapters 8-Conclusion, 234-306. After reading the book and hearing some of the criticisms of the work presented in the class debate, students should write a 2-3 page response paper. The paper should contain three parts: 1) an explanation of Markowitz and Rosner's main points; 2) an explanation of Scranton's criticism; and 3) an explanation of which perspective they thought was the most persuasive and why.

Reinforcement Activity 1: Understanding Epidemiological Studies
In the late 1980s, a pharmacist in the St. Gabriel neighborhood named Kay Gaudet began to notice that a number of her customers were receiving medications having to do with various reproductive problems. She also sensed that the number of miscarriages in her neighborhood was unusually high. St. Gabriel was one small community in "cancer alley," an 85-mile corridor along the Mississippi River between Baton Rouge and New Orleans that included 136 petrochemical plants and 7 oil refineries. Gaudet suspected that the reproductive issues she had noticed were connected to the pollution from the chemical companies. She decided to conduct an informal study to see how the rate of miscarriages in the St. Gabriel community compared with other areas. Gaudet found that of the 2,100 people who lived in St. Gabriel, there were 75 miscarriages between 1985 and 1988.

Although Gaudet's findings reinforced her belief that the chemical plants were responsible for the threats to her community's health, a study published in 1989 by the Tulane Department of Public Health and Tropical Medicine found that the rate of miscarriage in St. Gabriel and two surrounding communities—Carville and Sunshine—was statistically not higher than the state average.
The discrepancy between the two studies provides an opportunity for students to consider some of the challenges and limitations of epidemiological studies. In this activity, students will read about each study and learn to think critically about these kinds of studies and their role in regulating potentially hazardous chemicals.

Documents for Reinforcement Activity 1:

A. J. Michael Kennedy, "'Chemical Corridor' By `Old Man River,' New Health Fear," *Los Angeles Times*, May 9, 1989.
B. LuAnn E. White et al., "St. Gabriel Miscarriage Investigation, East Bank of Iberville Parrish, Louisiana," Final report of study conducted by Tulane University, School of Public Health and Tropical Medicine, New Orleans, September 27, 1989.
C. *Deceit and Denial*, p.256-257 for Gaudet's criticism of the Tulane Study.

Discussion Questions:

1. How do the Gaudet and Tulane studies differ? How are they similar?
2. Why do the studies come to different conclusions?
3. What are some of the methodological limitations of Gaudet's study?
4. What are some of the methodological limitations of the Tulane study?
5. What are some of Gaudet's criticisms of the 1989 Tulane study?
6. Do you think her criticisms are valid? Why or why not?
7. If you were the Governor of Louisiana, what kinds of action would you take to deal with the problems associated with "cancer alley"? Which study would you use to justify your actions? Why?

Reinforcement Activity 2: Mapping Cancer Alley

In this activity, students will examine the locations of petrochemical plants in cancer alley and explore demographic data about surrounding communities. Who are the people who live near our country's largest concentration of petrochemical industries? Why do they live there? The purpose of this spatial analysis is to encourage students to think how questions of social and environmental justice play into debates over the regulation of synthetic chemicals.

Procedure: Click on the U.S. National Library of Medicine's Environmental Health E-Maps site (TOXMAP): http://toxmap.nlm.nih.gov/toxmap/home/welcome.do. In the search fields, select "Louisiana" as the state. A map showing the locations of all facilities that are included in the Toxic Release Inventory will appear. Students will be able to visually see the large concentration of toxic plants along "cancer alley." Have students zoom in on this part of the state by clicking on the "Zoom In +" icon. To the right of the map there is a section called "Apply to this map." This gives users options to add about race, income, and health of the area under investigation.

1. Have student clink on "U.S. Census Data" and in the list of data from "2000 Race," have them select a category to investigate. Then have them click on "Submit." The map will then show this demographic data with the location of the TRI facilities superimposed on it. Ask students to examine the relationships between concentration of facilities and this demographic data. Do they see any patterns?

2. Then have them return to the right side of the map and click on "Income Data." Have them click on the Per Capita Personal Income value for a given year. Again, ask students to examine the relationships between concentration of facilities and this demographic data. Do they see any patterns?

3. Repeat this with the "Health Data" section and have students explore different categories under the "Mortality, Cancer 2000-2004" field. Again, ask students to examine the relationships between concentration of facilities and this demographic data. Do they see any patterns.

4. Ask students to reflect on what these maps. Where does the information used to generate these maps come from? What general patterns to they seem to show? How would you go about testing relationships between the location of plants that release toxins and surrounding communities? What are the strengths of mapping tools such as TOXMAP? What are their weaknesses? What kinds of questions do these spatial analyses raise?

Have them repeat steps 1-3 for their home communities. How do their home communities compare to "cancer alley"? Do they notice any similar patterns? What are the major differences?

Additional Resources:

1. Chemical Industry Archives, http://www.chemicalindustryarchives.org/
2. Bill Moyers, *Trade Secrets: A Moyers Report*, PBS Special Report, http://www.pbs.org/tradesecrets/program/program.html.
3. Toxic Comedy Pictures, *Blue Vinyl* website, http://www.bluevinyl.org/animation.htm.