

Introducing a series of lessons in the VISIT HAZMAT Investigations. This is an incomplete draft for review purposes internally in VISIT.

## **What Toxic Chemicals Are In Our Neighborhood?<sup>i</sup>**

### **Introduction to a series of lessons**

#### ***Purposes of this Investigation***

This series of lessons introduces ways to use the US EPA's Toxic Release Inventory (TRI), EnviroFacts, and other online sources of information to investigate toxic chemicals in your neighborhood or watershed. The series introduces uses of the TRI to identify toxics releases in a region and to explore releases, transport, accumulation, breakdown, toxicity, and recycling. The lessons illustrate several ways in which spatial reasoning enter into the analysis, beginning with spatial relationships between a county and a watershed. This series illustrates some techniques you can apply in working with very large data sets. One of the challenges is to find ways to sift through the large number of different toxics released to make sense of the data. You will identify which are the most significant in a particular locality in terms of type of chemical, locations of the releases, who is releasing them, potential impact of those releases on the environment, and trends over time. You will also identify which of the types of information available are most relevant from the perspective of your curriculum purposes for the investigation.

#### ***Intended Audience for this Lesson***

Teachers of chemistry, environmental science, biology, technology, or social sciences in secondary school are the intended audience for this lesson.

#### ***Materials for these Lessons***

- You need a WWW browser and a connection to the Internet that allows for reasonably fast access to the World Wide Web in order to use these lessons satisfactorily. Test your browser. If it takes longer than one full minute to access <http://www.epa.gov/triexplorer/reports.htm> then it may not be practical to take this lesson at that computer.
- A spreadsheet program such as Excel is helpful but not required.
- A color printer is useful for printing out reports and maps from the WWW.
- To use the lessons in your classroom, it is helpful to have a map that shows roads, streams and elevations in your watershed or county to post on the classroom bulletin board. If you do not have a topographic map a street map will do.

#### ***Background: Toxic Release Inventory and the Emergency Planning and Community Right to Know Act***

In 1984 a deadly cloud of methyl isocyanate killed thousands of people in Bhopal, India. Shortly thereafter there was a serious chemical release at a sister plant in West Virginia. These incidents underscored demands by industrial workers and communities for information on hazardous materials. Public interest and environmental organizations around the country accelerated demands for information on toxic chemicals being

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released "beyond the fence line" -- outside of the facility. Against this background, the [Emergency Planning and Community Right-to-Know Act \(EPCRA\)](#) of 1986 was enacted.

EPCRA's primary purpose is to inform communities and citizens of chemical hazards in their areas. Businesses must report the locations and quantities of chemicals stored on-site to state and local governments. This helps communities prepare to respond to chemical spills and similar emergencies. The goal is to reduce risk for communities as a whole.

Through EPCRA, Congress mandated that a Toxics Release Inventory (TRI) be made public. TRI provides citizens with information about potentially hazardous chemicals and their use so that communities have more power to hold companies accountable and make informed decisions about how toxic chemicals are to be managed.

Manufacturers have to report releases of more than 600 toxic chemicals to the environment. The reports are submitted to the U.S. Environmental Protection Agency (EPA) and state governments. EPA compiles this data in an on-line, publicly accessible national computerized Toxics Release Inventory (TRI).

TRI facilities are required to report on releases of toxic chemicals into the air, water, and land. In addition, they need to report on off-site transfers -- a transfer of wastes for treatment or disposal at a separate facility. Facilities are also required to report on pollution prevention activities and chemical recycling.

### ***Lessons in this Series***

#### **Lesson 1: Identifying Your Study Area Using EPA Watershed Locator**

Locating your county and watershed in the EPA Watershed Locator; assessing the overall environmental picture in your study area; orienting your school within the watershed.

#### **Lesson 2: Identifying Toxics Releases in Your Study Area**

Getting the big picture of volumes of chemicals released in the current year; analyzing the chemical report; identifying facilities that are releasing a particular chemical.

#### **Lesson 3: Learning about a Toxic Chemical**

Determining the chemicals to investigate, the types of information needed for the study purpose and study area, and the information sources to use. Evaluating relevance of information found from several different sources.

#### **Lesson 4: Identifying Toxics Trends in Your Study Area**

#### **Lesson 5: Studying the Rate of Transport of Chemicals Through the Watershed**

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Lesson 6: Estimating the amount of a toxic chemical in an ecosystem by using its persistence and bioaccumulation data from the TRI Chemical Substance Facts and the release data for a waterway.

### ***Extended Activities and Related Resources for the Teacher***

- *Teach with Databases: Toxics Release Inventory* by Jay Barracato. Published by the National Science Teachers Association with support from the U.S. Environmental Protection Agency. 1998 NSTA.
- *Hazardous Materials Emergency Planning*. A VISIT investigation course by Walter Paul, teacher at Chelsea H.S.
- *GIS in Schools* Chapter x: HAZMAT by Walter Paul (URL here for downloading the pdf file).

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