SENIOR MAP COMPANION GUIDE

CANADIAN INSTITUTE FOR ENVIRONMENTAL LAW AND POLICY

L'INSTITUT CANADIEN DU DROIT ET DE LA POLITIQUE DE L'ENVIRONNEMENT

For High School Teachers

March 2003

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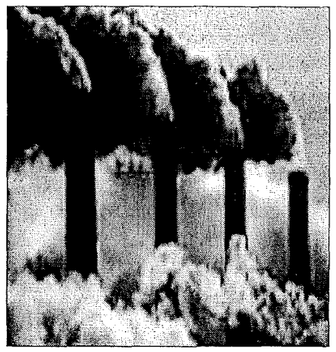
Introduction



Do you want to know how much pollution is being released in your community? As a teacher, do you want to be able to use this information in a meaningful way? Do you want to empower your students to take a stand against pollution? The Canadian Institute for Environmental Law and Policy (CIELAP) has undertaken this project to help you carry out all of the above. This guide, and the accompanying poster, will give you:

- A basic understanding of the National Pollutant Release Inventory (NPRI)
- An explanation of how to read the information found on the maps
- The tools to find out where pollutants are being released in your community
- An understanding of the importance of using the NPRI in the classroom
- Sample lesson plans, based on curriculum objectives
- Details about additional information found on the Internet

What is the National Pollutant Release Inventory (NPRI)?

The National Pollutant Release Inventory (NPRI) was created by Environment Canada in 1992 to provide Canadians with information on pollutants released into the environment or transferred off-site for release or treatment. It is the only legislated, publicly accessible database of its kind in Canada.

There are 268 substances currently on the list for the 2000 reporting year. Under the Canadian Environmental Protection Act (CEPA), owners or operators of facilities that manufacture, process or otherwise use one or more of the NPRI-related substances under prescribed conditions must report.

All NPRI information and data are accessible on the internet at Environment Canada's National NPRI website: **www.ec.gc.ca/pdb/npri**.

Who has to Report?

The NPRI is far from a complete listing of every source of pollution in Canada. It only covers pollution coming from facilities that meet reporting requirements. Those requirements are:

- The facility must have at least 10 full time employees
- The substance being reported must be manufactured, processed or otherwise used at a concentration of 1%
- The facility used at least 10 tonnes of the substance being reported

"Around 2,400 facilities report to the NPRI every year."

Currently, 2,419 facilities report to the NPRI every year. Facilities report their releases to air, water, land or underground injection, as well as their transfers off-site for treatment, release or recycling of substances. This is facilitated through free reporting software and assistance from regional Environment Canada offices.

There are plans to add different requirements (including the addition of greenhouse gases) to the NPRI in the coming years.

The Purpose of the NPRI Poster

Why should you use the NPRI in the classroom? How can you make all the data found in the NPRI relevant to your students?
CIELAP has developed the map in your hand to help give students a better understanding of where pollution is released and transferred in Canada. CIELAP undertook this project to highlight the importance of educating for sustainability. The information on the map can be used in many subject areas, in many different age groups and for many different purposes.

The poster also speaks to important curriculum objectives. This guide will help you find the connections between the NPRI map and curriculum expectations. It will help you translate the data found on the map into fun, exciting and meaningful activities for your students.

How to Use This Map

Using this poster is very easy. The following sections will explain to you, the teacher, the different elements of the poster.

List of Pollutant Codes, Facilities and Explanatory Text
Throughout the poster, you will find text boxes that explain the NPRI in more detail. Read through these with the class first. Also, point out the list of pollutant codes and facilities which provide the data for the circles on the map. Can you find any patterns?

On-Site Releases Map
The map in the top left hand corner represents the largest releases of pollutants by facilities in Canada. It is broken down into two types of releases: Toxic/Carcinogenic and Other Pollutants. Within these 2 types of releases, each release is colour-coded to reflect how that pollutant is being released into the environment. Under the NPRI, facilities must tell Environment Canada if the pollutant is being released to water, air, land or through underground injection. The size of each circle on this map represents the total comparative quantity of release. Therefore, the largest circles represent the largest releases. Ask the students to compare the size of circles within colours. Make sure they notice the border on the circles: if the border is red, then that pollutant is toxic, if it is black, then that pollutant is not considered toxic.

Provincial Summary Map
The map and charts on the right-hand side represent a summary of all releases, transfers and recycling by province. This map gives a Canada-wide perspective of NPRI data and allows students to compare across provinces. As reported on the map, the NPRI data is just a starting point for understanding pollution in Canada. Ask yourself and the students to guess why certain provinces have higher pollution or recycling levels.

Off-Site Transfers Map
This map, found at the bottom of the poster, is set up in the same way as the "Releases Map", however, it depicts the largest transfer of pollutants off-site for treatment or release. A lot of the time, facilities will not directly release their pollutants to the environment. Instead they will transfer them off-site to be treated (by various methods including: physical/chemical/biological, incineration, municipal sewage treatment or storage) or to be released (to landfill or for underground injection). Ask the students what they think of these categories –– does sending waste for incineration constitute a treatment? Is landfill storage better than direct release?

Small Receiving Facilities Map
Once pollutants are sent off for treatment, how do we know where it goes? What is the impact of the "receiving" facilities? In the bottom right-hand corner of the poster, there is a small map which shows this interesting data. Encourage the students to find out where pollutants are being sent. Is one part of the country carrying a larger burden than others in this category?

Data Found on the Back of the Map
The charts found on the back of the poster provide all the data for the maps. There is an alphabetical listing of all pollutants and their corresponding releases and transfers. On the right-hand side there is a breakdown of industrial sectors and their corresponding releases and transfers. There is also a set of ranking tables which show the Top 5 facilities within each category. Students can use these helpful background tables to discover more information about the NPRI.

"The Map gives students an idea of where in Canada the top polluters are located."

For High School Teachers

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More Information

There is a lot of information out there to help you and your students better understand pollution releases and transfers in Canada. Below is a list of some supplementary materials and websites you can use:

- "Citizen's Guide to the NPRI" — CIELAP published this booklet in 2000 to give citizens a better understanding of the tools available to find out what toxics are being released in your neighborhood

- Pollution Watch website (*http://www.pollutionwatch.org*) — together with the Canadian Environmental Law Association and Environmental Defence Canada, CIELAP is set to re-launch *www.pollutionwatch.org*, a website that allows users to simply enter their postal code to discover who is polluting in their neighborhood

- Environment Canada's Website (*http://www.eg.gc.ca/pdb/npri*) — the official site of the NPRI, allowing users to do data searches based on chemicals, companies and communities.

- Eco-Kids Online Website (*http://www.ecokidsonline.com*) designed to inspire children to become life-long environmental stewards, EcoKids Online is an invaluable resource for educators, youth group leaders and parents.

If you'd like more information on the impact of pollution on human health, please visit:

- Canadian Institute for Child Health - *http://www.cich.ca/project-safe.htm*

- Canadian Health Network - *http://www.canadian-health-network.ca/1environmental_health.html*

- Environment Canada Kids Page - *http://www.on.ec.gc.ca/kids_e.html*

- Health Canada's Environmental Health Program - *http://www.hc-sc.gc.ca/ehp/*

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The Lead Maze (Science Lesson Plan)

This example lesson plan was developed by CIELAP in collaboration with Toronto teachers. Trial runs or pilot tests of the activities are still needed to ensure that they can be implemented as intended. We would appreciate any feedback from educators to further develop these lesson plans into a valuable tool for teaching about sustainability.

Summary:
The class will be divided into "expert" groups. Each group will research and present on a different aspect of the relationship between humans and a chemical found at the NPRI map. For this particular lesson, we chose lead, but any common chemical that your students will know about can be substituted.

Key Concepts:
- identify impacts/links between human health and the environment
- students will discuss what they and society can do about toxic chemicals
- students will learn where and how chemicals are used
- students will discover and discuss possible alternatives to the chemical
- students will gain an understanding of the prevalence of the chemical in different regions of the country - including about where it exists in their own backyard

Learning Outcomes:
Grade 11 Environmental Science
- demonstrate an understanding of factors that influence the sustainability of the natural environment and evaluate their importance
- analyse how various factors influence the relationships between organisms and the natural environment
- explain why it is important to be aware of the impact of human activities on the natural environment

Grade 12 Chemistry in the Environment
- assess the effects and the implications for society of the levels of various substances in the environment
- demonstrate an awareness of the need for both government and individual citizens to take measures that will ensure a healthy environment.

Suggested timeline/length:
This lesson will last approx. 6 class periods. The first class should be spent on the characteristics and uses of lead.

The next two periods should be spent in the computer lab, explaining the scope and purpose of the NPRI map and NPRI website. Background websites, such as www.pollutionwatch.org, can be used to further explain its applicability.

The 4th class should be spent on the general context of NPRI, and to have the students work in their groups. In the last two periods, the groups will present their findings.

Materials/supplies:
To carry out this activity, please assemble the following:

- computers equipped with Internet
- CIELAP's NPRI map, additional information on lead
- case study example taken from the Citizen's Guide to the NPRI (available at www.cielap.org)
- group evaluation sheets

You will need to assemble the following handouts:

- suggested resources for researching lead (one of the resources could be PollutionWatch web site http://www.polutionwatch.org)
- You can find tables of toxic materials on the back side of the NRI
- Citizens Environment Watch web site can help you to find out how to take action (http://www.utoronto.ca/envstudy/cew/)

You may assemble use the following transparencies/overheads/powerpoint:

- effects of lead on global nutrient cycles
- effects of lead on human health system

Step-by-step:

1) Introduce the NPRI map and the web site to the students.
2) You might use the following questions to encourage their interest:
   - What chemicals are released in your province?
   - What company is the largest manufacturer of lead in your province?
   - What types of substances are being released in your province which are recyclable?
3) Provide background on chemical releases in the environment. This will include case studies where the chemical has affected human health. Articles that identify the chemical, name the actors involved, and the final outcome of the case study may also be helpful. These can be found and flushed out through CIELAP's Citizen's Guide to the NPRI (http://www.cielap.org) or can be found on the Internet.
4) Once students have read about chemical releases in the environment (particularly lead), divide them into group (randomly assign or let the choose) based on different actors in the lead maze – elected officials, governmental regulators, chemical manufacturers, interested citizens, etc.).
5) Hold presentations, where the groups will have to prove to the "expert panel" (i.e. you, the teacher) the benefits of lead to society, strategies for reducing lead use and options for cleaning up releases.

Extensions (optional):

Hold a discussion (either in small groups and have students report out) or with the whole class together) on the last day about "Where do we go from here...?" and "What can we do about it?"

References:

- http://www.ec.gc.ca/pdb/npri
- NPRI map
- http://www.pollutionwatch.org
- http://www.cielap.org
- Canadian Environmental Education Curriculum Assessment Program http://www.ceecap.com

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