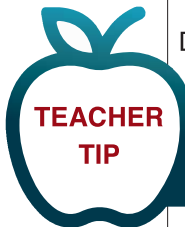# Activity 2.1: Who is releasing pollutants in our community?

Summary	Students use the NPRI Student Dashboard to find out about facilities in their community that report to the NPRI. They manipulate the data to visualize yearly data and propose questions that might be answered by the NPRI. Data analysis limitations are discussed.
What to do	Do we have facilities releasing pollutants in our community? **TEACHER TIP** — **Provide some extra time for students to explore the mapping function – they might spend the first few minutes finding each other's homes.** **MAP VIEW** 1. Use the magnifying glass to look up your city or town. 2. Find a facility nearby. What information does the NPRI collect about the facility? 3. Click the "Release Details" button to explore the facility's pollutant release history over the past 10 years. Click the "Map" button to return to a full-size image of the map. **RELEASE DETAILS VIEW** 1. Are the Releases/Disposals/Recycling more or less the same over time? 2. Are there any anomalies? 3. Has the facility always released the same pollutants? 4. *Are there others that may no longer be released? What could account for these changes?* (Governmental regulation; new technology, higher or lower production practices, no manufacturing; pollution prevention activities; changed substances used, etc. Reasons of variations in transfer of formaldehyde may include change in operations of the facility, change in estimation methods, change in waste generated, change in products used for treatment, and cleaning of equipment or machinery.)? 5. Does the NPRI data provide explanations for changes from one year to the next? Unfortunately, providing explanations on yearly variation is entirely voluntary, and as such may not be reported by the facility. 6. Are there problem areas in our communities? How can you tell if it's a problem? Does the NPRI provide the information necessary to enable you to make that conclusion? • Are there other facilities releasing the same pollutant in the same area? • Must learn more about toxicity levels and effects on human and environmental health. • Even if we know the toxicity levels, further study is required to determine whether or not it is a problem • Example: NPRI has information on the amount of lead released into water as well as the name of the body of water in which it is released. We don't know the body of water's volume, flush rate, if there are species at risk, etc.

What to do cont.	**EXTENSION ACTIVITY** Check reasons for change in the facility's comments by using company's NPRI ID on the full version of the NPRI Data Search Tool. Although not required, many companies do list reasons for pollutant release anomalies. Consult the history of reporting requirements (History of reporting requirements: National Pollutant Release Inventory - Canada.ca) to determine if changes were due to reporting requirement changes Students could research toxic threshold levels for given pollutants, keeping in mind that many factors affect the toxicity of a pollutant release, as detailed in (6).
What you need	• NPRI Student Dashboard: Activity 2.1 • Pollutants in Your Environment - Introduction PPT for Classes – slide 32 • Student Handout: Activity 2.3 Who is releasing pollutants in our community?

↻ Teacher Backgrounder

NPRI data limits

Events or changes at facilities can alter facility data values. Some examples of changes that may affect reported quantities include:

- changes in production levels
- upgrades to operating practices
- plant expansions
- change of ownership
- temporary or permanent closures
- pollution prevention measures
- accidental releases

Activity 2.1: Who is releasing pollutants in our community?

Discover facilities releasing pollutants in your community and nearby.

WHAT TO DO:

1. Open the NPRI Student Dashboard (https://public.tableau.com/app/profile/ingenium5439/viz/NPRIStudentDashboard/Instructions to Activity 2.3.

2. Click the "Map View" button to see the location of pollutant releasing facilities in Canada.

3. Hover over the map and use the magnifying glass to look up your city or town.

4. Find a facility nearby. What information does the NPRI collect about the facility?

   _____

5. Click the "Release Details" button to explore the facility's pollutant release history over the past 10 years.

   a. Are the Releases/Disposals/Recycling more or less the same over time? Provide evidence for your answer.

   _____

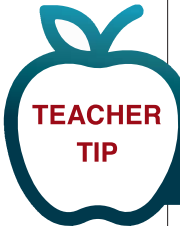   b. Are there any anomalies? Provide evidence for your answer.

   _____

   c. Has the facility always released the same pollutants? Provide evidence for your answer.

   _____

   _____

   d. Are there others that may no longer be released? What could account for these changes?

   _____

   e. Does the NPRI data provide explanations for changes from one year to the next?
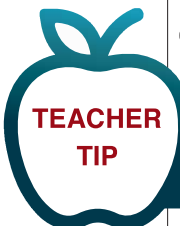
   _____

   f. Are there problem areas in our communities? How can you tell if it's a problem? Does the NPRI provide the information necessary to enable you to make that conclusion?

   _____

   _____

Activity 2.2: To recycle or not to recycle?

Summary	Students compare pollutant release across sectors to find out which are the largest polluters to air, water and land, as well as which have the highest/lowest transfers for recycling. Using a polling app or coloured cardboard, students will predict the answers to the following questions, available on the NPRI Student Dashboard.
What to do	**Poll 1:** Which sectors are the largest polluters for each of air/land/water? Click on the air, land or water icon to reveal the answer. *Reflection*: Is it possible to make a direct comparison on the environmental impacts of these sectors by looking at this graph? If not, what information would you require? NPRI data is not enough to assess the risks and impacts posed by pollution to the environment and human health. You can combine it with information from other sources and consider factors such as: • inherent toxicity • physical and chemical properties (such as, persistence, bioaccumulation) • the medium (air, land or water) affected by the substance released • transport and transformation (movement, breakdown) pathways • amount, timing, nature and level of exposure **Poll 2**: Is the distribution of pollutant release EVENTS even between air, land and water? If not, which has the highest number of release events? Which has the lowest? *Reflection*: Which pollutant destiny (air, land, or water) do you think poses the biggest threat to our planet? **Poll 3**: Which sectors have highest/lowest proportion of transfers for recycling? Reminder: we are referring to the sector's waste, not the product being manufactured. *Reflection*: As a Canadian citizen, are you satisfied with these results? Why or why not? Why aren't more sectors recycling their waste? Is it because the waste is not recyclable? Is it because they're choosing not to recycle? Should governments insist that they use products and processes that lend themselves to recycling and recovery? **TEACHER TIP** **To reset the poll, unclick the selected icon.** **EXTENSION ACTIVITY:** Ask students to guess which sectors create the highest amount or air/land/water pollution for specific pollutants (see Pollutants of Interest). Then, have them check their answers using the Activity 1.6 tab on the NPRI Student Dashboard.

What You Need	• Computers with access to the Internet to access the NPRI Student Dashboard Activity 1.6
	• Pollutants in Your Environment - Introduction PPT for Classes – slide 31
	• Activity 1.6 Student Handout

Activity 2.3: Accidental Releases

Summary	Students manipulate the NPRI data to explore trends in accidental releases. Questions on who monitors NPRI data are raised.

Can facilities predict the type and amount of pollutants being released each year?

TEACHER TIP

The first column is the number of EVENTS and that the yearly trends are in TONNES.

1. Which sectors report the most spills/fugitive events over the past 10 years?
2. Based on the yearly trends in the bar chart graph, which sectors have seen improvements? Have some gotten worse?
3. Take a look at the yearly graph and select a year that seems particularly different from the others. Are you able to manipulate the data to find out what happened? Keep track of your filters to be able to compare with your classmates.

TEACHER TIPS

Selecting a sector will reduce the number of companies that appear in the bottom window, enabling students to see more substances. Otherwise, students may scroll down the list to see various substances.

Students can investigate the company further by using company's NPRI ID on the full version of the NPRI Data Search Tool. Although not required, many companies do list reasons for pollutant release anomalies.

What to do

WHOLE-CLASS DISCUSSION

Does NPRI flag facilities with significant spills, leaks or fugitive releases? NPRI only requires an explanation when there is a 30% variation from the previous year to ensure that it is not due to an input error. *Who is monitoring the NPRI data? Is information automatically sent to industry watchdogs?* NPRI does not monitor the severity or the impacts of the events it records – it acts as a repository for scientists, decision-makers and individuals to use

Question accepted practice of "reporting thresholds" in industry. *What is stopping a company from creating several facilities in order to "fly under the radar" and not be required to report to the NPRI?* For example, NPRI has a 20,000-employee hour threshold: if the company has a small staff, it is not required to report to the NPRI (some substance must be reported regardless of the number of employees) since the reporting process would be considered too onerous. Could a company automate positions normally held by employees to bypass this threshold? NPRI does not require companies to report emissions from smokestacks shorter than 24 metres. Could a company build 10 smaller smokestacks on different sites instead of one large smokestack to circumvent the reporting requirement?

What to do cont.	**EXTENSION ACTIVITY**
	Use the data (company, year, substance spilled) to help them find an article that would further their understanding of exactly what happened to provoke this event and whether or not there were consequences (impact on environment, fines, was a clean-up needed, etc.).
TEACHER TIP	**In order to isolate an event, click on one of the taller bars to see the events that occurred that year. The releases (by substance) will appear in decreasing order, enabling students to find the facility that caused the largest accidental release. Note that students can scroll down the details list to see the amounts released for each substance.**
What You Need	• Pollutants in Your Environment - Introduction PPT for Classes– slide 36 • Teacher computer with projection screen or a smartboard with access to the Internet to access the NPRI Student Dashboard Activity 2.3

Teacher Backgrounder

Limitations of NPRI Data

Does not include all potential harmful pollutants – more than 23,000 substances on Environment Canada's Domestic Substance List

- Does not cover pollutants that have pesticide applications only

- Does not include greenhouse gases (tracked separately in the Greenhouse Gas Reporting Program, but common facilities have both GHGRP and NPRI IDs listed in their reports)

- Generally does not include pollutants that fall under the threshold of 10 tonnes manufactured

- Does not include mobile sources such as cars, trucks, and construction equipment (tracked separately in the Air Pollutant Emissions Inventory)

- Does not include natural sources such as forest fires and erosion (tracked separately in the Air Pollutant Emissions Inventory)

- Does not include sources such as dry cleaners and gas stations

- Does not include exempted facilities

- Generally does not include smaller facilities

- Does not include information about risks of pollutants released or transferred

- Does not include information on exposures to people or the environment

- Does not include information about the amount of pollutants allowed to be released and transferred under permits regulations or agreements

> *Excerpt from* Griffin, R (2011) Accessing NPRI and Pollution Watch Data. Canadian Environmental Law Association. https://cela.ca/wp-content/uploads/2019/08/NPRI-Presentation.pdf

- Although facilities are encouraged to comment on why amounts changed from one year to the next, this is completely voluntary, making it difficult to establish trends from year to year.

- Reporting requirements change from year to year. For example, in 2021, reporting thresholds for Total Particulate Matter (TPM) and sulphur dioxide (SO2) increased from 5 tonnes per year to 25 tonnes per year. If an individual were to attempt to make a comparison between 2020 and 2021, their analysis could inaccurately conclude that the total releases of these substances decreased when in reality many facilities may not have reported their releases in 2021 if they did not meet the 25-tonne threshold.

USING AND INTERPRETING DATA FROM THE NATIONAL POLLUTANT RELEASE INVENTORY

https://www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/using-interpreting-data.html