

# Chemical Risks and My School



## Summary of the Curriculum

Students explore an interactive map showing schools at risk from chemical facilities across the United States. They can directly research what chemical facilities are in the immediate vicinity of their school, the chemicals used, the potential hazards represented by these chemicals, how federal, state, and local agencies regulate chemical safety, how to make a presentation about what they have learned, and how to engage as active citizens on this issue – how to creatively think about what they can do to make their communities safer.



## Learning Objectives

Students will:

- Become more familiar with using mapping tools
- Learn how to calculate “vulnerability zones” (use radius and distance calculations)
- Learn how to search for and utilize information from online data sets
- Conduct research on dangerous chemicals and safer chemical alternatives
- Practice presenting information/making information accessible to different audiences
- Learn how to reduce the size of chemical danger zones
- Discuss solutions to the problem of chemical risks
- Learn how informed citizens can get engaged on an issue and make their voices heard by:
  - Making persuasive presentations
  - Writing letters to the editor and/or op-eds
  - Sending in comments to federal agencies
  - Writing letters to elected officials

## Materials Needed

- A projector or SMARTboard to display the interactive map and an Internet connection, OR
- Access to computers or iPads for students so they can explore the map and conduct Internet research individually or in groups.
- Web address for interactive map: <http://tesla.foreffectivegov.org/KidsAndToxins/bin-release/>
- Web address for state fact sheets: <http://www.foreffectivegov.org/kids-in-danger-zones-state-factsheets>

## Subjects

Social Studies, Science, Geography, American Government, English/Language Arts, Geometry

## Grades

Middle school/high school

## Introduction

Begin by telling the story of the recent chemical disaster in West, Texas. In April 2013, a fertilizer plant exploded, killing 15 people and injuring more than 200. The explosion leveled the surrounding neighborhood and destroyed three schools. Thankfully, it happened at night, so no students were in the schools at the time.

Show news clips or photographs of the incident to help students recognize the devastation caused by this accident. Ask the class whether they think that the students who attended school nearby had any idea that they were at risk from a chemical disaster.

Next ask the class whether or not they think they face a similar risk. Are there any potentially dangerous facilities nearby? Explain to the class that chemical facilities have *vulnerability zones*, or circles surrounding them that indicate the area that would be affected by a disaster. Tell students that these vulnerability zones can range from less than a mile to 40 miles from the actual facility. Now ask students again whether they think their school is in danger.



Use a projector or smart board to display the interactive map. Explain the different components of the map and what information it can show. Have students explore the map for a bit, either as a whole class or as individuals/groups. Provide some guidance on to what to look for (i.e., number of vulnerability zones their school lies in, distance to the nearest facility), but allow them to explore a bit on their own and make some initial inferences.

Once the students have had the opportunity to explore the map, ask them to share their initial reactions. Does the map surprise them? Did they notice any patterns in the placement of facilities? Do they tend to be in residential areas, isolated areas, and/or in poor or wealthy neighborhoods? Do they think that the people who live, work, and go to school nearby are aware of the dangers?

## Research

Now have the students dig a little deeper and find out specific information about the facilities nearest to their school. Have students jot down the number of dangerous facilities (if any) whose vulnerability zones their school lies in. Have them also write down the distance to the nearest chemical facility. Then choose one or two of the closest facilities and find out what chemicals are putting the nearby population at risk.



Next have them research the health effects of exposure to this chemical. The Centers for Disease Control and Prevention's (CDC) [Toxic Substances Portal](https://www.cdc.gov/toxsubstances/)<sup>1</sup> is a great tool. Then have them explore whether safer alternatives to the chemical exist for those facilities, and, if so, whether any facilities have switched.

Finally, have them compare the *Kids in Danger Zones* map with other local maps that show other buildings or spaces are within nearby vulnerability zones, including hospitals, nursing homes, day cares, and public parks. (You can use the worksheet included in the appendix to help guide students through these research questions.)

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<sup>1</sup> <http://www.atsdr.cdc.gov/substances/index.asp>

You can also share the [fact sheet](#)<sup>2</sup> from your state and have students explore the schools and industries listed on it.

## Discussion

Bring the class together again and discuss what students learned during their research. The following question categories can serve as a guide:

The Extent of the Problem: How many dangerous facilities are putting our school at risk? What chemicals do those facilities use and what are the potential health effects? What other buildings are within nearby vulnerability zones?

Raising Awareness: How can you, as a responsible citizen, raise awareness about chemical risks? Who in your community should know about this? How would you reach out to that person or persons to make them aware of the risks?

What Can Be Done: What can our school do to be better prepared in the event of a chemical disaster? What can the community do in order to be better prepared or to make facilities safer? Are there any safer chemicals that nearby facilities could use? What are the benefits to the community?

Are there safer chemicals that the facility could use? How much do you think it would cost to shift to safer chemicals? What other steps could those facilities take to reduce the possibility of disasters? What company owns the facility that has put the school at risk? Does the company or facility have a good safety record? Is the company that owns the facility profitable? Are there things that citizens can do to encourage the facility to shift to safer alternatives?

What should the government do to make sure these facilities are safe? Who in the government is responsible for the health and safety of people in our community? What can the federal government do? What can state government do? What can local government do?

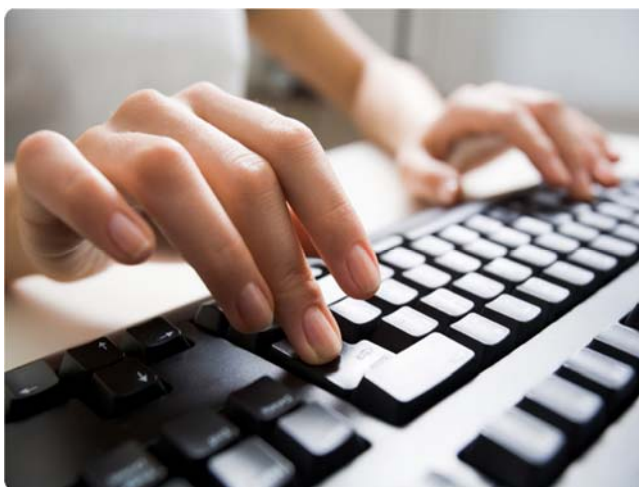
Next Steps: What can informed citizens do to advocate for greater chemical safety? Transition to the following extension activities.

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<sup>2</sup> <http://www.foreffectivegov.org/kids-in-danger-zones-state-factsheets>

## Civic engagement, citizen participation and voice

These activities help students apply the knowledge they gained on chemical risks and advocate for safer practices. You can assign one of the following activities or allow students to choose on their own. Below are summaries of each extension; activity pages for each are included in the appendix.



- **Extension I: Students draft action letters to the Environmental Protection Agency (EPA).** Students submit a letter to EPA as part of its “Request for Information” process, asking EPA to make it mandatory for facilities to switch to safer chemicals.
- **Extension II: Students write a letter to the editor or a news release.** In the first option, students will learn the purpose of a letter to the editor, read example letters, and draft a letter themselves that will be sent to a local publication. In the second, students will research local reporters who may be interested in covering the story and draft a press release to send to them.
- **Extension III: Students will create visual presentations that inform community members about this issue.** This may take the form of an informational/persuasive poster, a multimedia video, or an art project.

In each of these extension options, students should be employing the information that they gathered in the Research section. This should include information specific to the facilities in their area, such as the number of schools they put at risk, the distance to the nearest schools, the chemicals they employ and what their health effects are, and whether safer alternatives exist, along with any examples of facilities that have switched to safer alternatives.

Encourage students to take the next step and share their work with their local community as well as state and national leaders. We also encourage you as the teacher to share with us the work your students have been undertaking to advocate for stronger chemical standards. You can e-mail examples to [afrank@foreffectivegov.org](mailto:afrank@foreffectivegov.org).

## Appendix I: Student Worksheet

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Use the interactive map and Internet research to answer the following questions:

1. Is your school in any vulnerability zones? If so, how many? What is the distance to the nearest chemical facility?
2. What other buildings and spaces are in nearby vulnerability zones? Look for things like hospitals, nursing homes, day cares, public parks, etc.
3. Go to the map and click on one facility whose vulnerability zone your school is in, or the facility closest to your school. How large is its vulnerability zone? How many students/schools are in the zone?
4. Click on the same facility, and then follow the link for more information. Glance through the facility's RMP (risk management plan) and see if you can find one chemical that it uses. (Tip: Do a page search for "Process Chemicals" and see what chemical is listed in this box.) Use Internet research to find out the health effects of this chemical.
5. Look through the RMP to see what type of facility it is (i.e., water treatment plant, bleach manufacturer, etc.) You can often find this under the Executive Summary near the top of the page. Do an Internet search to see why the facility uses the chemical you listed above and whether there are any alternatives.

## Appendix II: Drafting a Letter to the Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) is asking for public comments on how it can improve chemical safety regulation. You can take part by submitting a comment to EPA, urging them to make your school and community safer. Comments must be received by Oct. 29, 2014 and can be submitted online (instructions are below).

### Background

EPA wants to know how it can improve chemical safety, including whether facilities should be required to use safer chemicals. As the interactive map shows, millions of students study within the vulnerability zone of dangerous facilities, and many of these facilities use dangerous chemicals even though safer ones are available. If these facilities were required to switch to safer chemicals, their vulnerability zones would shrink or be eliminated and the number of students at risk would drop. Therefore, creating regulations that require facilities to adopt safer alternatives is one of the best ways for EPA to safeguard communities.

### What should my comment include?

An effective comment letter begins by stressing the importance of the issue and urging EPA to take action. You can talk about how the issue concerns you directly if your school is within a vulnerability zone, or just emphasize that this is an issue affecting young people like yourself (whether or not your school is affected). Feel free to use expressive language like “I am shocked that my school is in danger...” or “I demand that regulations are adopted.” Just be sure to maintain a respectful tone.

Your first paragraph should clearly state the issue (millions of students are at risk of chemical disasters) and provide a solution (facilities should be required to use safer chemicals). Your next paragraph can expand upon the solution you provided above and argue why it is the best way forward. You can add an additional paragraph to reemphasize the importance of the issue, perhaps even including a story about how chemical dangers have affected your community. The last paragraph should restate your solution and hold EPA accountable for meeting this demand.

Below is a sample comment from a student whose school lies in a vulnerability zone. You can feel free to use this template or draft your own that addresses specific dangers within your community.

## Sample Letter

Dear Administrator McCarthy:

*As a student at [insert school name and city/state], I am shocked to learn that my schools lies within the vulnerability zone of a dangerous chemical facility. Yet my story is not unique; one in three American students also attends school within a vulnerability zone. These facilities use toxic, explosive chemicals even though safer alternatives exist. We should not have to worry about chemical disasters when there are safer chemicals for these facilities to use.*

*I urge you make it a requirement that facilities use inherently safer technologies (IST) whenever possible. Voluntary use of IST is not enough to protect the millions of students like me who study near dangerous facilities.*

*We cannot forget the chemical explosion in West, Texas in April 2013, which killed 15 people and destroyed three schools. No student should have to be afraid of a chemical explosion near his or her school, but until facilities use safer chemicals, thousands of more schools are in similar danger.*

*Please require facilities to use IST. We are relying on EPA to make sure we can go to school without the fear of chemical disasters.*

Sincerely,

Name\*

\*You can choose to sign your first name, full name, or just leave it anonymous. Keep in mind that your letter will be available for others to view online.

## Where do I send my letter?

Letters must be received by the end of the day on Oct. 29, 2014. You can send your letter [online](#) by visiting [regulations.gov](http://www.regulations.gov) and searching for EPA-HQ-OEM-2014-0328.<sup>3</sup> Click on the “Comment Now!” button and copy and paste your comment into the box. Click on “Continue” and then review your comment and make changes, if necessary. Click the box next to “I read and understand the statement above” and then click “Submit Comment.”

Congratulations! You’ve just taken part in comment process and made your voice heard.

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<sup>3</sup> Direct link: <http://www.regulations.gov/#!submitComment;D=EPA-HQ-OEM-2014-0328-0001>



## Appendix III: Writing a Letter to the Editor/Op-Ed

A letter to the editor, also called an “op-ed,” is a short opinion piece submitted by a reader to a newspaper. The op-ed page is one of the most widely read sections of a paper and serves as a forum for community members to get their message out to a wide audience.

### Finding your audience

Begin by searching for publications in your area that print op-eds. These may include your local newspaper, local magazines, or even your school newspaper.

Read a few of the publication’s op-eds to get a feel for how they are written. You may notice that op-eds are more likely to be published if they respond to a recent news story, oftentimes in support or opposition of the issue. They are generally short (under 250 words) and therefore must be direct and to the point. A typical op-ed will start with a paragraph explaining why the topic is important and stating the writer’s viewpoint. Then it continues with a persuasive explanation of why others should feel the same way, often with relevant examples supporting the position.

### Sample op-ed

Read the following example op-ed. In it the author is direct, clearly states her opinion, and supports her view through examples. She also uses persuasive language to convince readers to take up her opinion.

*Dear Editor:*

*Did you know that in the U.S., one in three students attend a school near a potentially dangerous chemical plant? That's a shocking number, and the problem isn't limited to a few states. Almost all states are affected, including [fill in your state here]. Want proof? Check out <http://www.foreffectivegov.org/kids-in-danger-zones-state-factsheets>.*

*Water treatment plants, factories, chemical manufacturing plants, and other places use hazardous chemicals like chlorine gas that put our kids in harm's way. With so many schools so close to these plants, students would be in serious danger if a fire, explosion, or toxic chemical leak happened.*

*The good news is, it doesn't have to be this way. The federal EPA is looking at new rules that could require plants to shift to safer alternatives and companies could simply reduce the amount of dangerous chemicals they store at their plants. But until this happens, the city council should not allow new plants to be located near schools or residential areas.*

*We can fix this if we speak up and demand better for our students.*

*Sincerely,*

The writer uses the first paragraph to explain the issue (one in three students is at risk). The second paragraph expands on the issue, providing examples of the types of facilities and chemicals putting students at risk. The third paragraph offers a solution (EPA needs to require safer alternatives; new plants should not be built near schools).

## Writing your op-ed

You can follow a similar format for your op-ed. Use the first paragraph to explain the issue. Feel free to personalize it and talk about the specific risks to schools in your area (i.e., the number of schools at risk, the other buildings/public spaces in vulnerability zones). Be clear to state your opinion/reaction to the issue.

Use the following paragraph(s) to elaborate on the first. Dig deeper into the facilities in your area and who they are putting at risk. Talk about why people should care about this issue. Explain that safer chemicals exist and that requiring facilities to use them would reduce the risk to your community. Tell readers what they should do to address this issue.

## Submitting your op-ed

Start by sending your op-ed to just one paper or magazine, as publications often won't print it if other papers are planning to do so. Visit the opinion or editorial section of the publication's website to find out how to submit an op-ed. If you can't find information on where to send it, you can try e-mailing or phoning the publication.

Submit your op-ed and then check the publication occasionally to see if it gets published – and if anyone comments on your letter!

## Appendix IV: Sending a Press Release to Local Media

The goal of a press release is to generate news coverage on an issue that is important to you or your organization. A successful press release will cover a newsworthy topic, be clear and easy to read, and be sent to the appropriate reporters.

### Finding possible reporters

The first step is to research reporters in your area who may cover the topic of chemical risks to schools. Start by searching local newspaper and television station websites. Look for reporters who cover issues like education, children/families, local issues, or even political news. Locate their e-mail addresses, which should be available online. If not, you can send an e-mail to the news director or to the paper/station's general e-mail.

### Writing a press release

An effective press release will include:

- The date you sent the release out.
- Your contact information so that reporters can contact you.
- A catchy headline that sums up the story and grabs attention. The more compelling your title, the more likely reporters will read through your press release.
- A brief (1-2 sentence) introduction explaining the issue and talking about where the data comes from. Be sure to refer to the Center for Effective Government's [report](#)<sup>4</sup> so that reporters know what you are citing.
- Background on the issue and report. Talk about the types of facilities putting students at risk and why they are so dangerous. Use statistics on the number of students at risk *nationally*.
- Statistics on students affected in your state or community. You can draw from the research you conducted in class or from the state fact sheets available online.
- Quotes from students, teachers, and parents. Interview fellow classmates and community members and insert these into the press release. Reporters like quotes they can use in stories.
- Links to where reporters can learn more about the issue. Use hyperlinks that connect reporters to the interactive map, report, and state fact sheets. Also include a link to where the public can comment on the Environmental Protection Agency's (EPA) chemical regulations. (These links are all included below.)

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<sup>4</sup> <http://www.foreffectivegov.org/files/kids-in-danger-zones-report.pdf>

## Sample Press Release

The following is a sample press release written by a student for news media in her area. You can use it as a template and insert information specific to your state/community and quotes you have gathered yourself. Alternatively, you can write your own press release, using the sample as a guide.

*PRESS RELEASE*

*--For Immediate Release--*

*September 30, 2014*

*Contact: [Include your full name, e-mail address, and phone number in case reporters want to be in touch.]*

*Headline: 26 Percent of North Dakota Students in Danger of Chemical Disasters*

*One in four North Dakota students is within the vulnerability zone of a dangerous chemical facility, according to a nationwide study released in September by the Center for Effective Government. The study includes an interactive map that displays all U.S. schools as well as the facilities putting them at risk.*

*Nationally, more than one in three students – 36% – study within the vulnerability zone of a facility reporting to the Environmental Protection Agency’s (EPA) Risk Management Program. These facilities use highly dangerous chemicals and must report the amount that they use, produce, and/or store on site. The Risk Management Program also collects information on possible accidental releases and identifies the area surrounding the facility that would be affected by a chemical accident – referred to as “vulnerability zones.”*

*In North Dakota, 67 schools are within such vulnerability zones, putting 27,211 students in danger from potential chemical disasters. Counties with the highest percentage of students at risk include Burleigh County. You can access the North Dakota state fact sheet for more information on chemical safety in North Dakota.*

*Students at Bismarck High School are alarmed to learn that their school is at risk of chemical disaster. [Insert one or two student quotes.]*

*Chemical disasters are a real threat: in April 2013, a fertilizer plant exploded in West, Texas, killing 15 people and destroying three schools. Facilities can take steps to improve safety, including switching to inherently safer technologies. To date, however, there are no rules requiring facilities to adopt safer technologies.*

*Teacher Jane Doe introduced her students to the map and asked them to consider how they can organize the community around the importance of using safer technologies. [Insert a quote from your teacher here.]*

*Students at Bismarck High are urging community members to stand up for their safety and tell EPA to require facilities to use safer technologies. So far, students have [include other activities your class is doing around the topic of chemical safety].*

*If you would like to send a comment to EPA, you can visit [Regulations.gov](http://www.regulations.gov)<sup>5</sup> or sign the Center for Effective Government's [action alert](https://secure3.convio.net/ombw/site/Advocacy?page=UserActionInactive&id=359)<sup>6</sup> that urges EPA to require safer technologies.*

*You can also access the interactive map, national report, and state fact sheets by visiting <http://www.foreffectivegov.org/kids-in-danger-zones>.*

## **Sending your press release**

Find the list of reporters and their e-mail addresses that you created earlier. You can send a press release to each of these reporters. Be sure to include a personalized note in the e-mail message and your contact information, and of course, the press release itself!

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<sup>5</sup> <http://www.regulations.gov/#!submitComment;D=EPA-HQ-OEM-2014-0328-0001>

<sup>6</sup> <https://secure3.convio.net/ombw/site/Advocacy?page=UserActionInactive&id=359>

## Appendix V: Visual Presentation

There are many ways to inform people about chemical risks in their community. Sometimes visual displays are more powerful and compelling than numbers and facts. Below are some suggestions for communicating the dangers of chemical facilities through visual presentations. Feel free to draw from these or take another route – just be sure that you have a plan for sharing these with the community.

### Creating informational materials

Students will work individually or in groups to create materials to inform other members of the community about this issue. These materials may include a poster, flyer, brochure, public service announcement video, art project, or another creative approach.

First, discuss your target audience. Are you reaching out to fellow students, to parents or teachers, or to local leaders? Knowing your audience will help you create a targeted message.

Second, decide on your message. What are the most important ideas to convey to your audience? Do you want to highlight the fear or outrage you feel because your school is at risk? Do you want to point out the safer chemicals that nearby facilities could be using? Do you want to tell people what they can do to get involved? Decide on your message and keep it to one or two key goals.

Third, choose your medium. Think about the best way to convey your message. If you want to use a lot of data, perhaps consider a flyer or public service announcement. If you to express how it feels to study near a facility, you can try creating a poster or painting that expresses this through images or words. Feel free to be creative!

Finally, create a plan for presenting your creation. If you created a brochure, where will you make copies, and where will you distribute it? If you have a poster presentation, where can you display it so that the public will view it? If you created a video, can you share it with your school or local television stations? Are there any local leaders that you want to take the information to?

In all of these approaches, try not to overload your work with too many details or numbers. Sometimes the simplest messages are the most powerful!

### Mapping the risks in your community

The interactive map allows you to print screen shots – just zoom into an area of interest and click the printer button on the top of the page. This is a useful way to highlight risks in a particular area and share that information with others.

First, consider who you want to share the map with. Do you want to present it to local officials? Your school board? Local facilities?

Second, decide what areas to include in your map. If your audience is a particular facility, you can zoom in to its vulnerability zone and show the schools it is putting at risk. If the mayor is your audience, you can use a screen shot of the entire city. Think about what information is most important for your audience.

Third, take a screen shot of the map and find a creative way to display it. You can take it to a local copy and print shop and get it enlarged and printed on poster board, or you can create a poster or brochure to share the map with your audience. Think about the best way to reach your target audience.

Don't forget that schools are not the only buildings at risk. You may choose to highlight other buildings/public spaces that are in vulnerability zones, including hospitals, day cares, nursing homes, and public parks. Be creative in how you use the map!