

# 1. Mapping Pesticide Use at Your School

- Objectives:
- To build awareness of pesticide usage at school and in the community.
  - To build awareness of adverse health and environmental effects of pesticides.
  - To develop research, interview, calculation, writing and presentation skills.

**Note:** This project may be modified or expanded to focus on pesticide use in the entire school district, in city parks, on county or state roads, on golf courses, or in student's homes. If a large class or club is involved, students can work in groups to design and conduct research. One team can design questions and conduct interviews, one can work on getting or drawing a map and transcribing pesticide use data onto it, another can work on gathering toxicology data, one can work on developing a presentation of results for maintenance staff or PTA, one can work on writing an article summarizing the project for the school paper, etc. Groups will need to coordinate among themselves to accomplish these jobs. The project may also be expanded by combining it with Activities 2 and 3 in this guide.

## Activities:

- Read** at least two background books or articles on pesticides (see box to the right for some suggestions.)
- Interview** your school or school district grounds or building maintenance staff to gather data on what pesticides have been used in or around your school in the past one to two years, what pests were being controlled, what locations were treated, and what quantity of each pesticide was used. Try to learn more about what policies govern pesticide use at your school, too. **Study** the sample interview questions on the next page, or use the detailed questionnaire available on NCAP's Web site at <http://www.pesticide.org/PUseQuestionnaire.html>.
- Get or draw** a map of your school and transfer the pesticide use data to the map.
- Research** those pesticides and **write** a report summarizing your school's pesticide use practices and policies, health and environmental effects of pesticides used, and potential risks to students, staff and others. Make specific recommendations for change. Look at some reports others have done at [www.pesticide.org/SchPUseReports.html](http://www.pesticide.org/SchPUseReports.html), and also Activities 2 and 3 in this packet for related ideas.
- Plan** to make a presentation to your class or club (or another class), your school's principal, grounds and building maintenance staff, PTSA, or school district administrators summarizing your results and recommendations. **Write** a summary of your results for your school or neighborhood newspapers.

## Background Reading:

- Carson, Rachel. 1962. *Silent Spring*. New York: Fawcett Crest/Houghton Mifflin Co.
- Riley, B. 2000. *Unthinkable Risk: How Children Are Exposed and Harmed When Pesticides Are Used at School*. Eugene, OR: Northwest Coalition for Alternatives to Pesticides. Available on the Web at <http://www.pesticide.org/UnthinkableRisk.html>.
- Riley, B. 1994. *Getting Pesticides Out of Our Schools*. Eugene, OR: Northwest Coalition for Alternatives to Pesticides.

**Useful Terms and Concepts:** The following terms may help you think of aspects of pesticide use and hazards at your school that you will want to discuss in your report. The glossary will help you understand many of these terms. You will need to research others at your school or public library, or with the help of one of the resource organizations listed on the next page.

EPA registration of pesticides  
Acute toxicity/LD<sub>50</sub>  
Pesticide testing  
Pesticide risk/benefit analysis  
Applicator licensing  
Pesticide labeling  
Environmental fate  
Worker safety

Active ingredients  
Chronic toxicity  
Inert and trade secret ingredients  
Pesticide regulations and enforcement  
Posting and notification  
Pesticide exposure  
Pesticide residues  
Synergism and cumulative effects

Pesticide illness reporting  
Pesticide use recordkeeping  
Right-to-know laws  
Chemical sensitivity  
Pesticide efficacy  
Pest resistance  
Indoor air quality  
Student safety

## Gathering Your Data:



### Sample Pesticide Use Interview Questions

Here are some ideas of questions to ask your school or school district maintenance staff and/or principal:

- What chemicals or other means are used to control weed, insect or other pests? What are the active ingredients of the pesticides, if any are used? What are the "inert" ingredients? Does the school have Material Safety Data Sheets (MSDSs) and labels for the chemicals it uses on file and publicly available?
- When and how often are pesticide applications done (on a schedule, or only when a pest problem is present)? Who decides what level of pest is a problem? Who makes the decision about whether to use pesticides?
- Has the school ever experienced a head lice outbreak? Has spraying been done to control lice?
- Who does the actual application (school personnel or outside contractors)? Are all applicators licensed? (You can call your state Department of Agriculture to verify that particular named applicators have current licenses.) Are pesticides stored on the school site?
- What kind of records are kept of pesticide applications? Do records specify the amount of active ingredient used, the dilution rate or concentration and total volume of product applied, and the type of application equipment (e.g., backpack sprayer, aerosol can, fogger, time-release dispenser, baited trap, etc.) and techniques used (e.g., broadcast spraying, fogging, spot spraying, crack and crevice application?) How much of each product is used at each location? Are treated areas posted?
- Is the school nurse trained to recognize pesticide poisonings?
- What are likely agricultural, commercial, or residential uses of pesticides near the school?

### Pesticide Toxicity Research/ Resource Organizations:

The following organizations or agencies can provide information on health or ecological effects of pesticides. Pesticide manufacturers can also provide Material Safety Data Sheets (MSDSs) for their pesticide products. It is always a good idea to get information from more than one source, if possible, for comparative purposes. See if you can find any differences in the information you get from these sources, and how it is presented or interpreted.

NCAP  
PO Box 1393  
Eugene, OR 97440  
(541) 344-5044

NCAMP  
530 7th St. SE  
Washington, D.C. 20003  
(202) 543-5450

National Pesticide  
Telecommunication Hotline:  
1 (800) 858-7378

U.S. Public Health Service  
Agency for Toxic Substances  
1600 Clifton Road NE, E-29  
Atlanta, GA 30333  
(Has "Toxicological Profiles"  
for many pesticides.)

U.S. Environmental Protection  
Agency, Office of Prevention, Pesticides, and Toxic Substances  
401 M Street, SW  
Washington, DC 20460  
(Publishes *Recognition and Management of Pesticide Poisonings*, describing the general toxicology and poisoning symptoms of the major classes of pesticides.)



#### Web Resources:

- Many pesticide factsheets are available on NCAP's Web site at [www.pesticide.org/factsheets.html](http://www.pesticide.org/factsheets.html). Also check "Researching Pesticide Health Effects" at [www.pesticide.org/ResPHealth.html](http://www.pesticide.org/ResPHealth.html).
- ExToxNet offers pesticide information profiles on the Web at [ace.orst.edu/info/extoxnet/ghindex.html](http://ace.orst.edu/info/extoxnet/ghindex.html). Also available is a glossary of pesticide and toxicology terms.
- U.S. EPA information on pesticides can be found at [www.epa.gov/pesticides/](http://www.epa.gov/pesticides/). EPA offers pesticide factsheets (REDs) and more.
- The California Department of Pesticide Regulation offers information about pesticide products and active ingredients at [www.cdpr.ca.gov/dprdatabase.htm](http://www.cdpr.ca.gov/dprdatabase.htm).
- The Pesticide Action Network North America offers the Pesticide Information Services Database (PESTIS) at [www.panna.org/resources/pestis.html](http://www.panna.org/resources/pestis.html)

## Presenting Your Data: Maps and Charts

- Use symbols and colors to display as much information as possible on your map. See example on page 5.
- Data tables can be useful ways to display pesticide usage or toxicity information for your report. See examples that follow. You can make other charts describing the chronic toxicity data (e.g., cancer, reproductive effects, teratogenicity) and environmental hazards of the pesticides that you research.
- Consider using graphs or other displays, too, as appropriate. For example, you could graph the relative acute toxicities (e.g., LD<sub>50</sub>s) for the pesticide active ingredients used in your school, or the relative ounces or pounds per acre of the different products used at your school. Or you could set up a display of labelled jars filled with an amount of colored water corresponding to the estimated lethal dose to an adult or a child for each pesticide product or active ingredient your school uses. This would be a very visual way to convey toxicity information.
- Be sure to define all terms (e.g., acute and chronic toxicity) and units of measure (e.g., lbs./acre, applications per year) used on maps or charts. Describe the time period you studied, and be sure to explain what your data don't show or leave out. Thus, if you have no information about the identity or toxicity of the inert ingredients of a product, or if required toxicity tests on the active ingredient are not completed, mention this in your notes or in an accompanying written summary. Don't forget to reference your data to show where you got it (e.g., from school records, EPA materials, manufacturers MSDSs, NCAP factsheets, ExToxNet pesticide profiles, or other sources).

### On Variability and Bias in the Real World:



You will find that in many cases there is no single numerical answer or simple interpretation of toxicity or environmental fate data about a particular pesticide. Whether a test measures how toxic a particular pesticide is to a particular species of laboratory animal, how quickly a pesticide leaches through a particular type of soil, or how quickly a pesticide breaks down in a certain environment, there are many variables that come into play. See if you can explain some of this variability in your report. Can you make any conclusions about how much we should rely on animal or environmental testing data to protect us from the potential adverse effects of pesticides?

Pay special attention to any factual differences or discrepancies in the data (or its interpretation) that you get from different sources. Can you identify the biases inherent in various agencies' or organizations' materials? How can you know which is more accurate or more complete?

### Chart Ideas:

#### Pesticide Products Used at Rachel Carson High School, 2000

Product Name	Pesticide Class	Active Ingredient(s)	Inert Ingredient(s)	Signal Word/Warning
DursbanPro	organophosphate insecticide	chlorpyrifos (22.5%)	Xylene and other unspecified (77.5%)	Caution
Tempo 2	synthetic pyrethroid insecticide	cyfluthrin (24.3%)	Unspecified (75.7%)	Warning or Caution
Roundup	herbicide	glyphosate (41%)	Unspecified (59%)	Warning
Liquid Weed and Feed	phenoxy herbicide	2,4-D (6.9%)	Unspecified (93.1%)	Danger (skin and eye hazard)

Acute Toxicity of Pesticides Used At Rachel Carson H.S., 2000

Pesticide Product	Acute Toxicity (Median Lethal Dose or Concentration)	Estimated Fatal Dose for 60 kg Adult Human†
DursbanPro	LD <sub>50</sub> (oral, rat) = 623 mg/kg LD <sub>50</sub> (dermal, rabbit) = >2,000 mg/kg LC <sub>50</sub> (inhalation*, rat, 4 h.) = 1.62 mg/l	37.4 g ≈ 39 ml = 1.3 fl. oz >120 g ≈ 125 ml = 4.2 fl. oz
Tempo 2	LD <sub>50</sub> (oral, rat) = 500 mg/kg LD <sub>50</sub> (dermal, rabbit) = >5,000 mg/kg LC <sub>50</sub> (inhalation*, rat, 4 h.) = 0.5 mg/l	30 g ≈ 31.3 ml = 1.1 fl. oz >300 g ≈ 313 ml = 11 fl. oz
Roundup	LD <sub>50</sub> (oral, rat) = >5,000 mg/kg LD <sub>50</sub> (dermal, rabbit) = >5,000 mg/kg LC <sub>50</sub> (inhalation*, rat, 4 h.) = 2.6 mg/l	>300 g ≈ 313 ml = 11 fl. oz >300 g ≈ 313 ml = 11 fl. oz
Liquid Weed and Feed	LD <sub>50</sub> (oral, rat) = _____ mg/kg LD <sub>50</sub> (oral, dog) = _____ mg/kg LD <sub>50</sub> (dermal, rabbit) = _____ mg/kg	____ g ≈ ____ ml = ____ fl. oz ____ g ≈ ____ ml = ____ fl. oz ____ g ≈ ____ ml = ____ fl. oz

† Assumes humans are equally susceptible as the specified test species. This is an oversimplification that is not always true. Also, the conversion from weight to liquid volume is approximate, assuming 1 oz wt. = 28.35 g ≈ 29.57 ml or 1 fl. oz. Actual liquid volumes will depend on the density of the substance being measured. However, these measurements can give an estimate of actual and relative toxicities of various products.

\* Inhalation lethal concentrations (LC<sub>50</sub>s) reported in terms of hours of exposure to a given concentration of product.

A note about LD<sub>50</sub>s: When gathering acute toxicity data, be sure not to confuse LD<sub>50</sub>s for the **active ingredients** (e.g., glyphosate) with LD<sub>50</sub>s for the **formulated products** (e.g., Roundup). In many cases, these numbers will be different, due to the differing toxicities of the “inert” ingredients of a pesticide formulation. In the case of Roundup, for example, one of the inert ingredients, polyoxyethylated tallow amine (POEA), is three times more acutely toxic than glyphosate, the active ingredient. However, both glyphosate and POEA are diluted with water in Roundup. Based on actual human poisoning incidents, doctors have estimated that 3/4 of a cup of the formulated product Roundup is a fatal dose for an adult human. Compare this with the calculation in the table above, extrapolated from animal test data.

More to Think About: What can you say about the relative toxicities of herbicides (e.g. Roundup) compared to insecticides (Dursban Pro and Tempo 2) from the above chart? What can you say about the relative oral and dermal toxicities of the listed pesticides? Can you calculate the corresponding lethal doses for a 30 kg child?

Amounts of Pesticides Used At Rachel Carson High School, 2000

Pesticide Used	Volume Used	Type of Application	Pest Treated	Location	Date/Time
DursbanPro	0.5 gal. of 0.25% spray	crack and crevice	cockroaches	kitchen	5/1 6:30 am
Tempo 2	25 ozs. of 0.05% spray	area spray/carpet	fleas	classroom	9/2 7:00 am
Roundup	0.5 gallon of 1% spray	spot spray	grass and weeds	track	5/3 3:00 pm
Weed and Feed Liquid	2 gallons	broadcast spray	dandelions	soccer field	3/24 8:00 am

