

Recognize Hazardous Routes

Grade: 5

State Standards: Grade 5 Health Education; Personal and Community Health, 1.3 P Describe how environmental conditions affect personal health. 1.5 P Define life threatening situations (e.g., heart attacks, poisonings) 1.6 P Explain that all individuals have a responsibility to protect and preserve the environment.

Preparation Time: 25 minutes

Activity Time: 1 hour

Key Words: Caution, Warning, Dangerous, Poisonous

OBJECTIVE

Identify ways people dispose of household hazardous waste (HHW). Identify the impacts these disposal methods have on health and the environment. Students suggest safe alternative management routes for household hazardous wastes. Learn vocabulary: poisonous, toxic, hazardous, dangerous, flammable, ignitable, corrosive, reactive, and irritant. Understand that the words: “caution,” “warning,” and “danger” have special meaning and that children should never play with certain types of household products.

MATERIALS

Worksheets, From Sink to Stream (maze); Hazardous Waste Routes; Learning about Labels; Routes of Exposure; Hazardous Products; and Dangers; worksheet, Words of Warning and Identify the Hazards, Unacceptable and Acceptable Waste, puppets and handouts of play.

(Optional:) Bring in examples of products with hazardous labels

BACKGROUND

Many products commonly used for cleaning, gardening and auto maintenance, if used or disposed improperly, are hazardous. (See attached “Unacceptable and Acceptable Waste”). These products are referred to by solid waste professionals as “Household Hazardous Waste” or HHW. In total, the County of Tehama spends around \$70,000 per year for HHW disposal and management.

You can recognize hazardous products because they have special signal words on the labels that say, “Caution”, “Warning”, “Dangerous” or “Poisonous”. Many of these products, when used by a business, have regulations on how they may be disposed. However, in our homes, there is little control over how these products are handled. Thus, education and awareness of these hazards, combined with knowledge of less toxic substitutes, will help preserve and protect our local and states environment.

Hazardous products can enter the environment in a variety of ways. Sometimes when a person has no more use for the product but there is still some left in the container, the products are dumped in toilets or drains (i.e. sinks and tubs). These drains go directly into sewers or septic tanks. The sewer systems usually lead to wastewater treatment plants,

which eventually flow to rivers. Wastewater treatment plants are not designed to handle most hazardous wastes. Also, large amounts of hazardous wastes may kill the living organisms used to break down chemicals in treatment and septic plants. If these organisms are killed, the system does not work properly, and hazardous wastes can enter our waterways.

Other inappropriate and illegal methods of disposal may include dumping on the ground, sending the material to the landfill or incinerator, or burning garbage at home. When applied to the ground, these hazardous chemicals can leach through the soil or out of leaking landfills, eventually contaminating our groundwater. Incinerating hazardous waste can release harmful air pollutants. Products in aerosol cans may cause explosions. People burning their own garbage at home can create serious hazards to themselves and the air quality by burning hazardous products and plastic containers.

Another way these chemicals enter the environment is through “surface run-off” during rain storms. For example, if gardening products are improperly or over applied, water running off your property during a rain storm may enter nearby streams, rivers, or sewer systems and cause surface water pollution. In the environmental field this is known as “non-point source pollution”. Non-point source pollution is of great concern because it is difficult to regulate. The best method of pollution prevention is to minimize the use of hazardous products and use good judgment when you use them.

PROCEDURE

Today we are going to learn about ordinary things inside or around our house that may be harmful (or hazardous) to us, to wildlife, or to the environment.

- **Can anyone name some things you have seen at your house that you believe could be dangerous?** (Some examples are: a type of cleaning product in the kitchen, laundry room, or bathroom or some other products used in your yard or on your car). Write the student’s responses on the board.
- Pass out the worksheet *Words of Warning* and instruct students not to turn over *Words of Warning*. First, fill in their own definitions of the words. Tell them that if they don’t know to leave it blank, and that by the end of the lesson, these words should be familiar to them.
- **Who knows what it means if something is poisonous, toxic, or hazardous? Something that is poisonous, toxic, or hazardous can cause illness, injury or death.** Students should know that these words mean that something can be harmful to people and to the environment and that great care should be taken to avoid these dangerous substances and to prevent their release into the air, water or soil.
- **Tell me and show me the five different routes a hazardous substance might enter the body.** (Eyes, nose, mouth, ears, skin). Display the transparency “Routes of Exposure”.

- Introduce the two puppets and tell the children that they have a story to share.
- Perform the play for the class (see “Hazardous Adventures” attached)

Reflection/Response:

- Display and discuss the transparency “Learning about Labels” or show actual examples of hazardous labels on products to the class.
- Display and discuss the transparency “Hazardous Products” and “Dangers”. Help students understand that chemicals are dangerous to humans, animals and the environment.

Now display the transparency “Hazardous Routes”. Help students realize how products get released either intentionally or accidentally into the environment through storm drains, waste water treatment plants, landfills, incinerators, and non-point sources as described in the Background section. Students should realize that these chemicals escaping into the environment can end in our bodies through drinking contaminated water or by eating fish from contaminated rivers, so we must use as much care as we can to properly use and dispose of these products.

Questions:

1. What warning words have you learned today?
2. Should you ever play with household products or try to use them without your parents permission? NO!
3. How do we get rid of hazardous products? First we use it properly until it is gone; next, if you have some leftover materials, give it to someone else who can use the rest; third, store it properly until it can be taken to a household hazardous waste collection center or to a collection event for hazardous products.
4. How will you keep yourself and others from getting harmed by these things?
5. Now turn your worksheet over and read the correct definitions for all of the important warning words you have learned today and fill in the definitions in your own words.
6. Assign Sink to Stream maze and the Tips for a Safer Home handout and ask students to talk with their parents about what they have learned.

ASSESSMENT

Students have a clear understanding of how products get released either intentionally or accidentally into the environment which can cause harm or damage.

LEARNING ABOUT LABELS

CLASS A  Compressed Gas	CLASS B  Flammable and Combustible Material	CLASS C  Oxidizing Material
CLASS D		
 1. Materials Causing Immediate and Serious Toxic Effects	 2. Materials Causing Other Toxic Effects	 3. Biohazardous Infectious Materials
CLASS E  Corrosive Material	CLASS F  Dangerously Reactive Material	



A PRODUCT IS HAZARDOUS WHEN LABELED

Corrosive/Caustic: A product that can burn and destroy skin on contact

Flammable: A product that can easily be set on fire or ignited

Reactive: A product that can detonate or explode when coming into contact with heat, sudden shock or pressure.

Toxic: A product capable of causing injury or death through ingestion, inhalation or absorption.



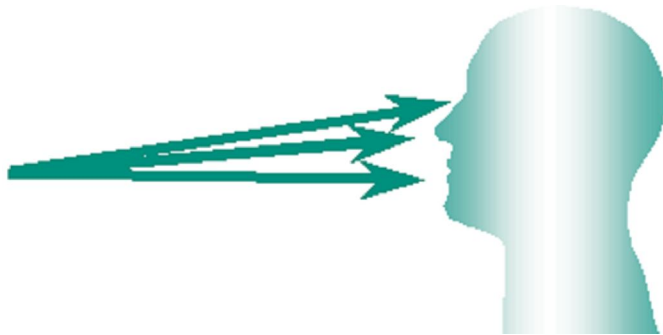
Dangers of Hazardous Household Products

Health Problems and Injuries

Mixtures of some hazardous products can produce dangerous vapors, explosions or fires.



Products containing acid or bases can burn skin, eyes or respiratory passages.



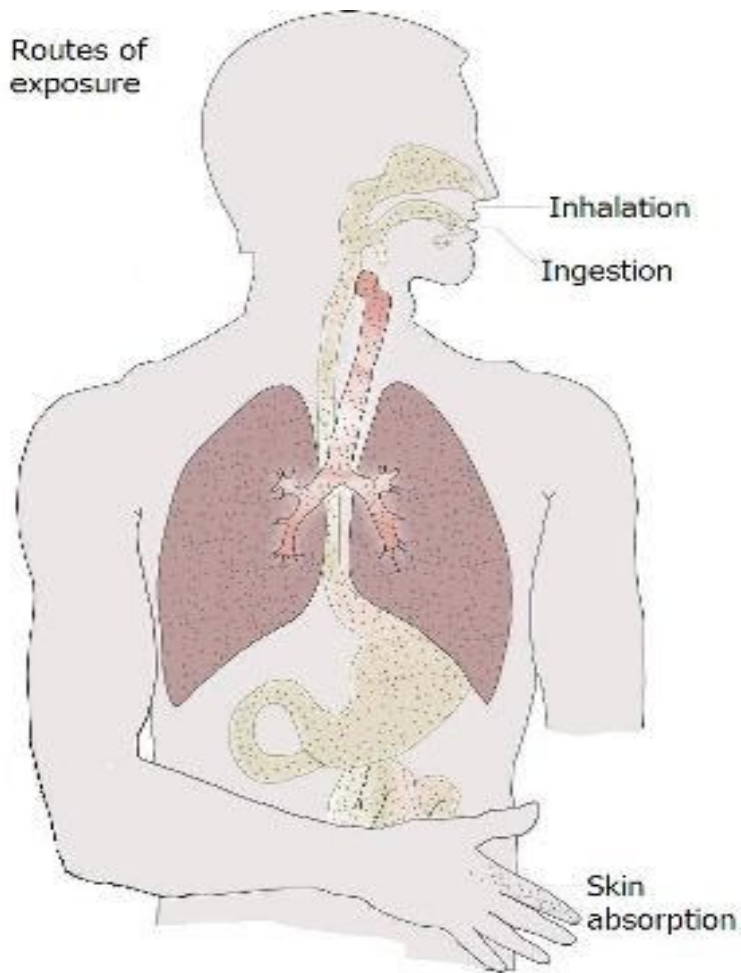
Exposure to some pesticides, paints and solvents can cause weakness, confusion, dizziness, irritability, headaches, nausea, sweating, tremors, and convulsions.

Repeated exposure to some chemicals can cause cancer or birth defects.

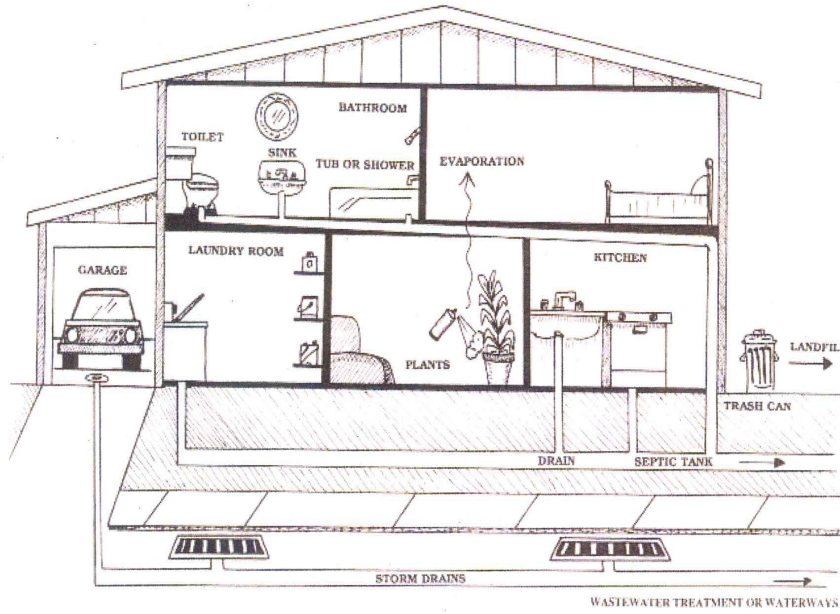
Hazardous materials placed in the garbage can cause serious injury to sanitation workers and damage the natural environment.



Routes of Exposure



Household Hazardous Waste Routes



WORDS OF WARNING

Fill in your own definition of what you think these words mean. If you do not know, leave the space blank. Now turn the page over and look at the definitions to see if you were correct. Fill in the correct responses or add to your own.

Toxic:

Ignitable/Flammable:

Corrosive:

Reactive:

Danger:

Warning:

Caution:

Hazardous:

Poisonous:

Reactive:

Irritant:

WORDS OF WARNING ANSWERS

Toxic: Hazardous materials that are poisonous, harmful, destructive, or deadly

Ignitable/Flammable: Easily started on fire; capable of burning rapidly

Corrosive: Chemical agent that reacts with or attacks the surface of a material causing it to deteriorate or wear away

Danger: Warning label for hazardous substances that are extremely toxic (lethal dose is a drop to a teaspoon)

Warning: Hazardous substance label for very toxic substances (lethal dose is a teaspoon to a tablespoon)

Caution: Warning found on a moderately toxic substance (lethal dose is an ounce to a pint)

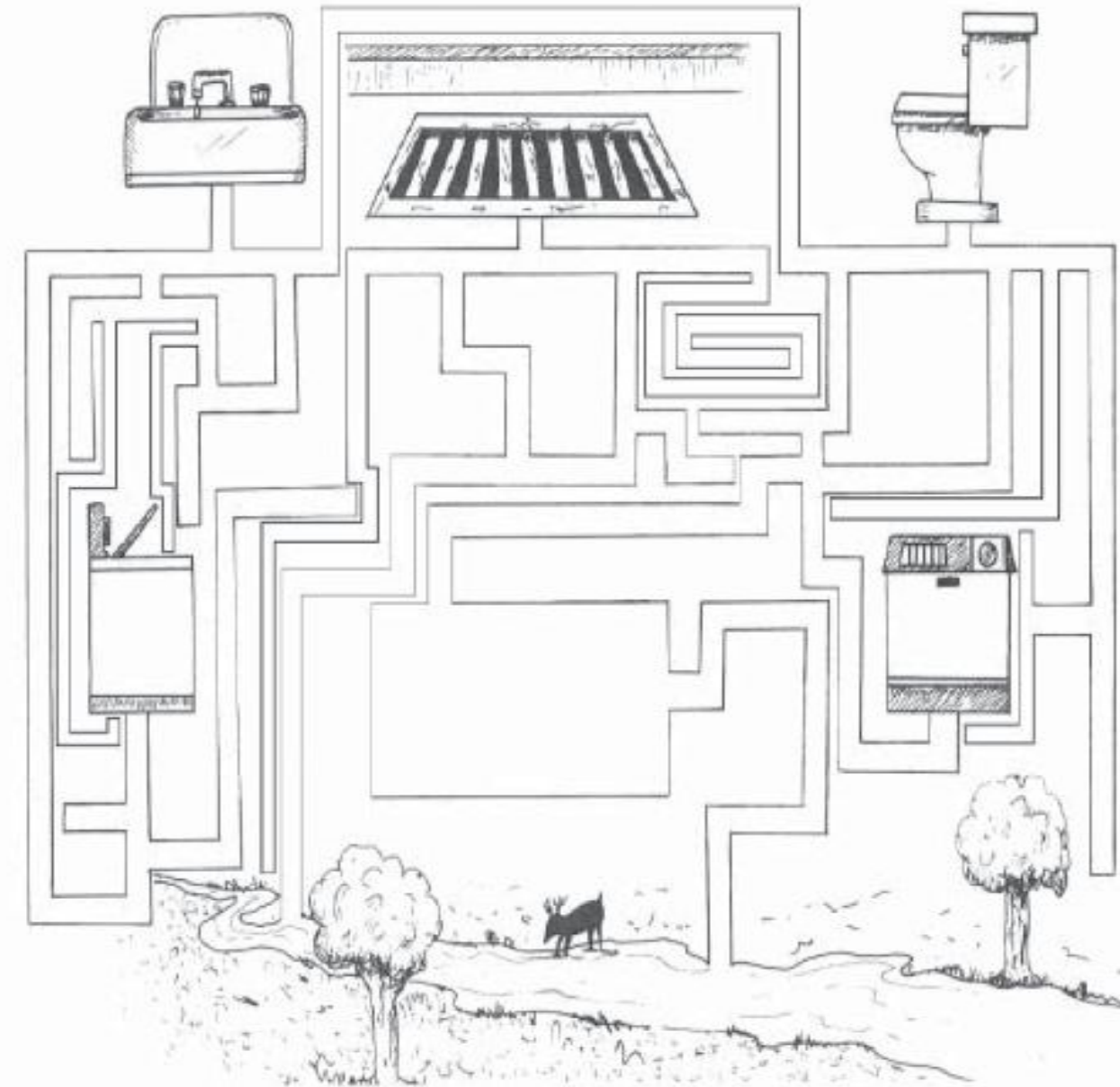
Hazardous: Substances which cause special problems because they are poisonous, explosive, corrosive of metal or skin, harbor disease-causing microorganisms, are radioactive, or are dangerous for any other reason

Poisonous: A substance that causes illness, injury, or death, particularly by chemical means

Reactive: Hazardous substance that undergoes an unwanted reaction when exposed to other substances

Irritant: Hazardous substance that causes soreness, burning or inflammation

Draw a line from the sink to the stream. Using a different color for each, draw a line from the toilet, storm drain, the dishwasher, and the washing machine. Which one(s) go directly to the stream? Which one(s) go to a treatment facility?



IDENTIFY THE HAZARDS

Circle the items that are most likely to be a hazard to people or the environment if used or disposed of incorrectly.



2009 Acceptable and Unacceptable Waste

TEHAMA COUNTY/RED BLUFF LANDFILL ACCEPTANCE POLICY

The Tehama County/Red Bluff Landfill (Landfill) reserves the right to reject any load. The Landfill does not accept waste generated outside of the County of Tehama. The Solid Waste Facility Permit for the Tehama County/Red Bluff Landfill limits the daily tonnage and vehicle trips. Please contact the Landfill in advance if your project will result in more than 50 tons or 20 vehicle trips per day. The following includes waste that can and cannot be accepted at the Landfill. Please contact the Landfill at 528-1103 to determine whether items not included on this list can be accepted. Acceptable and unacceptable waste includes, but is not limited to the following.

ACCEPTABLE WASTE

“Acceptable Waste” means all solid waste generated in Tehama County that can be buried in the landfill without special approval, including but not limited to:

- (a) Garbage;
- (b) Rubbish;
- (c) Refuse;
- (d) Residential heating ash that has been completely extinguished and cooled;
- (e) Waste paper;
- (f) Cardboard;
- (g) Commercial waste;
- (h) Demolition waste;
- (i) Construction waste;
- (j) Manure;
- (k) Dead animals;
- (l) Yard waste;
- (m) Empty non-rigid pesticide containers (bags);
- (n) Empty rigid pesticide containers decontaminated by triple rinsing and crushing;
- (o) Empty latex paint cans in which the lid has been left off and the paint completely dry;
- (p) Other materials that may in the future be included in the definition of ‘solid waste’;
- (q) Inert waste such as bricks, glass, masonry, concrete, and asphalt pavement that has been cured for three years or more.

The term “acceptable waste” merely means the waste can be legally buried in the landfill. Some types of “acceptable waste” are recycled and not actually buried in the landfill.

“Special Waste” means any waste that is otherwise considered acceptable waste but, by virtue of its unique properties, requires special handling. Such waste may present personnel safety hazards, require additional handling procedures, create odor and vector problems, generate excessive leachate, lead to excessive settlement, puncture or tear the landfill liner, pose a fire hazard, or increase the toxicity of landfill leachate. Some of this waste may require advance notification of landfill personnel and all require that they be brought to the specific attention of the gate attendant upon arrival. Some types of “special waste” are recycled and not actually buried in the landfill. Additional handling fees may apply for acceptance of “special waste”.

2009 Acceptable and Unacceptable Waste

“Special Waste” that require prior approval before being accepted at the Landfill. Please call (530) 528-1103 to receive approval.

- (a) Waste generated from an industrial facility;
- (b) Treated medical waste;

- (c) Asbestos (non-friable), double-bagged and handled in accordance with applicable laws and permits;
- (d) Municipal water treatment plant solids, managed in accordance with applicable laws or permits;
- (e) Sewage sludge digested and dewatered in accordance with state and federal regulations;
- (f) Residue and debris from wastewater treatment plant operations (grit and screenings with no free liquids);
- (g) Other waste that because of a change in applicable law may be handled under special requirements set forth in an applicable statute, rule, policy or permit;
- (h) Mobile homes;
- (i) Boats, all types motorized and non-motorized;
- (j) Soil containing traces of petroleum that can be classified as inert, nondesignated, and nonhazardous and/or in amounts greater than 5 cubic yards.

“Special Waste” that must be disclosed to gate attendant upon arrival.

- (a) Furniture and mattresses;
- (b) Electronic waste, including televisions and computers;
- (c) Appliances;
- (d) Appliances with hazardous waste removed (must be certified);
- (e) Tires, all types and sizes;
- (f) Soil in amounts of less than 5 cubic yards;
- (g) Fluorescent lights or other products containing mercury;
- (h) Universal waste;
- (i) Alkaline and rechargeable batteries;
- (j) Automotive oil, antifreeze;
- (k) Animals;
- (l) Items containing freon or ammonia;
- (m) Tree stumps;
- (n) Automotive batteries;
- (o) Latex (water-based) paints;
- (p) Propane tanks (5 gallons in size);
- (q) Non-asbestos containing insulation (must be double-bagged);
- (r) Other waste that because of a change in applicable law may be handled under special requirements set forth in an applicable statute, rule, policy or permit.

“Unacceptable Waste” means any and all waste that is not permitted for landfill disposal:

- (a) Hazardous waste, except for certain universal waste listed as “special waste”;
- (b) Radioactive waste;
- (c) Medical waste (e.g. medical sharps, surgical waste, biological waste, cultures, stocks, pathological waste);
- (d) Septic tank pumping;
- (e) Other waste prohibited from landfill disposal by local, state or federal law, regulation, rule, code, permit or permit condition;
- (f) Acceptable waste that because of its size, weight or shape, cannot be handled by transfer station or disposal facilities;
- (g) Waste containing free liquids (greater than 50% moisture by weight);
- (h) Waste regulated by the Toxic Substances Control Act (TSCA). TSCA regulated waste includes waste containing Polychlorinated Biphenyls (PCB’s) or having a PCB concentration equal to or greater than fifty (50) ppm, and radon;
- (i) Railroad ties, telephone poles, and other chemically treated wood products;
- (j) Friable asbestos;
- (k) Non-Friable asbestos that has not been double-bagged and declared prior to disposal;
- (l) Material containing lead that has not been declared and approved for landfill disposal;

- (m) Ammunition or explosives;
- (n) Fertilizers and pesticides, including but not limited to crop production or raising of animals;
- (o) Automotive vehicles

“Hazardous Waste” means any waste that is:

- (a) Required to be handled and or disposed as hazardous waste under regulations promulgated by the United States Environmental Protection Agency under 40 CFR part 261;
- (b) Designated a “hazardous waste” by regulations adopted pursuant to California law.

“Hazardous waste” are not permitted for landfill disposal. Examples of hazardous waste includes, but is not limited to pesticides, fertilizers, grease, oil-based paints, stains, solvents, pool and spa chemicals, detergents, disinfectants, acids, bases, drain cleaner, tub and tile cleaner, etching products, gasoline, kerosene, lead-based paint, creosote, tar, aerosol cans, and propane cylinders. Hazardous waste generated from households or conditionally exempt small quantity generators (CESQG) may be disposed at the Landfill or Corning Household Hazardous Waste facilities. The household hazardous waste facilities are operated on specific dates and times. Contact the Landfill for a current list of operating days and hours. Fees apply to CESQG. Please call the Landfill to determine if your business qualifies as a CESQG.

“Universal waste” means a hazardous waste that is exempt from certain hazardous waste management requirements and, therefore, are not fully regulated as hazardous waste. Examples of universal waste includes but is not limited to, fluorescent lights, dry cell and rechargeable batteries, electronic devices, and mercury containing equipment.

Hazardous Adventures

Rebecca: Hi Mateo! How are you?

Mateo: Funny you should ask. I had to go to the hospital last week. My stomach still doesn't feel very good.

Rebecca: Too much candy again, Mateo?

Mateo: Not exactly. I was having a good time playing house and I ate something that I found under the kitchen sink. It looked like something my Mom spreads on crackers at her parties...but it made me very sick, so the doctor makes me eat special foods until I feel better. At the hospital, they told me that there are lots of things in my house which are poisonous, toxic, hazardous, and dangerous to eat, smell, and touch.

Rebecca: Really? I can understand why eating something that is not really food would make you sick, but how can just smelling or touching something make you sick?

Mateo: Well, the doctor told me that some types of chemicals are so strong, that getting them close enough to smell might burn my eyes and nose! The doctor also said that some things will burn your skin if you touch it!

Rebecca: Wow! Let's look around my house for dangerous things. (Rebecca looks inside a cardboard box set upright like a cabinet—it has real products in it or magazine pictures of products that are hazardous.)

Rebecca: Mateo, how can we tell if something is dangerous?

Mateo: Let's look on the label for a picture of a skull and cross-bones. Another way to tell is to look for the words "caution," "warning," or "danger."

Rebecca: Look at this stuff! I'm going to throw it all in the garbage!

Mateo: NO, NO, NO! If you put it in the garbage it goes to the landfill and might leak into the soil or into the water deep in the ground that we drink from!

Rebecca: Oh, then I'll pour it down the sink! **Mateo:** NO, NO, NO! If you pour it down the sink, it goes to the water treatment plant, but some chemicals are so strong, they might get into the rivers or lakes which would harm the fish, plants, and other wildlife!

Rebecca: Oh, I see, what if we pour it into the ocean where there's lots of water, then?

Mateo: NO, NO, NO! There are simply too many people and too many chemicals to be safe. Rebecca, DILUTION IS NOT THE SOLUTION TO POLLUTION!

(Mateo turns to the audience...)

Everyone say it with me, "DILUTION IS NOT THE SOLUTION TO POLLUTION."

Rebecca: Okay, now I get it, but how am I supposed to deal with these dangerous things then?

Mateo: Well, now that they are already in our house, we should first use them as they were intended and follow the instructions so we don't use more than we need. Next, if we have used all of a product that we want and still have some left, we should ask some of our friends and neighbors if they might be able to use the rest.

Rebecca: Oh, good idea, Mateo! But what if I try this and I still have some dangerous stuff left?

Mateo: Well, then tell your parents to call the city or county to ask about special places that take hazardous things and have special ways to get rid of them. Some cities and counties have "Special Collection Events" where everyone in the community can bring in their poisonous or toxic products for proper disposal.

Rebecca: Cool! When my mom and dad come home, I'm going to ask them to be careful with hazardous things and tell them these things need special disposal in order to protect our water and our wildlife!

Mateo: That's a good idea, me too! And I'm never, ever going to play with household products or eat anything that I don't know for sure is food again.

The End