



Lesson: Hazardous Products Substitutes

Grade: K-3

Subject: Science, Health education

Objectives:

Students will:

- recognize signal words and visual symbols that indicate the presence of hazardous substances
- identify “how much” of various products would be dangerous to people or to the earth
- create a recipe book for safe substitutes for home use

Teaching Time: 40-50 minutes

Materials: transparencies, Signal Words, Routes of Exposure, Learning about Labels; worksheet, Identify the Hazards; Play, *Rocky’s Not-So-Fun Adventures*; take home sheets, Tips for a Safer Home and Safe Substitute Recipes; worksheet, Sink to Stream

experiment: food coloring; water; two large containers of glass to hold about 8 ounces of colored water; tablespoon/teaspoon set; eye droppers; small cups

(Continued)

Background:

Understanding the symbols and words that identify products which contain hazardous substances can help students avoid potential dangers. In addition, by pointing out these warnings, it may be possible to shop more carefully for the least toxic alternative for a given job and to wear the proper protective clothing when dealing with toxic substances. To learn more about hazards in the garbage see the Background in Lesson: Where is Away?

Procedures:

- Show class three cups labeled: “Caution”, “Warning”, and “Danger”. You might want small groups of students to each have three labeled cups.
- Display the overhead, “Signal words” and identify the words “caution”, “warning”, “danger”.
- Explain that something that has the label caution is the least dangerous, but sometimes there are products that perform the same function that are even less dangerous because they carry no warning labels at all. Help students understand that it is always better for human health and the environment to choose the least toxic product necessary to do the job.
- Display the overhead “Learning about Labels”. (Optional) show the students examples of products with warning labels, or use the labels that have been removed from the products, or use magazine cut outs of these types of products.
- Each group should also have a set of measuring spoons, an eye dropper, and a container filled with colored water.
- Measure two tablespoons of colored water and pour into the “Caution” container.
- Measure one teaspoon of colored water and pour into the “Warning” container.
- Measure one drop of colored water and pour into the “Danger” container.
- **The amounts in each container are the amounts of each product that would seriously hurt or kill a 150 lb. adult. Which product is the most dangerous?**
- The Danger label--it has only one drop of colored water.
- **How are you different from a 150 lb. adult? Would it take more or less of a hazardous product to make a child sick?** Less.
- **What type of protective clothing or measures should be worn when cleaning/working with chemicals?** In some cases, items worn might include: gloves, goggles (safety glasses), ventilation masks (surgical mask), and special protective overalls. (Optional: show gloves, mask and goggles to the students if you have examples).
- Show the overhead “Routes of Exposure.” Have students identify the parts of the body these items protect (eyes, lungs, skin) and to identify the 5 routes into the body for hazardous substances (eyes, nose, mouth, ears, skin).



- Fill the second large container or glass with water only. Ask students if they think it would be okay to dump hazardous chemicals into rivers, lakes or streams. Explain that by pouring chemicals into the sink or toilet, means that chemicals may get into our rivers, lakes and streams from overflowing septic systems or waste water treatment plants during heavy rains or when chemicals are difficult to remove thoroughly from the waste water.
- **There is a lot of water running in our rivers, lakes and streams. If each person puts just a small amount of chemicals into the water supply it will all get “washed away”, right? Let’s do an experiment to see what happens.** One at a time, have each student come forward and drop a drop of colored water into the plain water. Prompt students to observe how the color of the water changes as more students add colored water.
- **Who can tell me what is happening to the water? Do you think the same thing might happen to our rivers, lakes and streams, if we aren’t careful with dangerous chemicals at our homes? Yes!**

Reflection/Response:

- Give students the take home handouts “Tips for a Safer Home” and “Safe Substitute Recipes” and have students create “Less Toxic” cleaning recipe books. With teacher’s help, students can copy out some substitute product “recipes.” Use magazines to cut out pictures of nature, clean air, and water for use in decorating their books.
- Have them create a pledge to try one or more less toxic substitutes at home and take it home for their parents to sign.
- (Optional) Fill spray bottles with vinegar and water and allow students to practice cleaning windows or mirrors.

Extensions:

- Perform the play “Rocky’s Not-so-Fun Adventures”.
- Make advertisements for the “new” products that will substitute for the hazardous ones. (Review “Ads Add Up” and discuss how ads make us believe that chemicals are better than natural cleaners).
- Visit the Oregon Department of Environmental Quality’s Household Hazardous Waste website at: <http://www.deq.state.or.us/wmc/solwaste/hhw.html> and have students report on their findings.

(Optional:) examples of products with labels containing the words caution, warning, danger, or remove the labels from the products, or use magazine cut outs; dishwashing gloves; a surgical mask; goggles; general art supplies; magazine pictures of nature, a spray bottle, vinegar and water, two puppets (for the play).

- To find out more about safe disposal in your area, contact the city or county solid waste official or call the Household Hazardous Waste Hotline: 800-732-9253.

Common Curriculum Goals:

Science: Unifying Concepts and Processes

- Apply explanatory concepts of model, system, theory, probability, and replication

Health Education: Safe and Healthy Environment

- Explain safe physical, social and emotional environments for individuals, families, schools and communities
- Understand and apply strategies to improve and maintain individual, family, school and community health

Grade 3 Benchmark:

- Compare objects, drawings, and constructions to the real things they represent



Overhead: Signal Words

READ LABELS, LOOK FOR SIGNAL WORDS.

MORE DANGEROUS

DANGER

Extremely flammable,
corrosive or highly toxic
(poison)

Less than 1 teaspoon
can harm an adult



WARNING

Moderate hazard

1 teaspoon to 1 ounce
can harm an adult

LESS DANGEROUS

CAUTION

Mild/moderate hazard

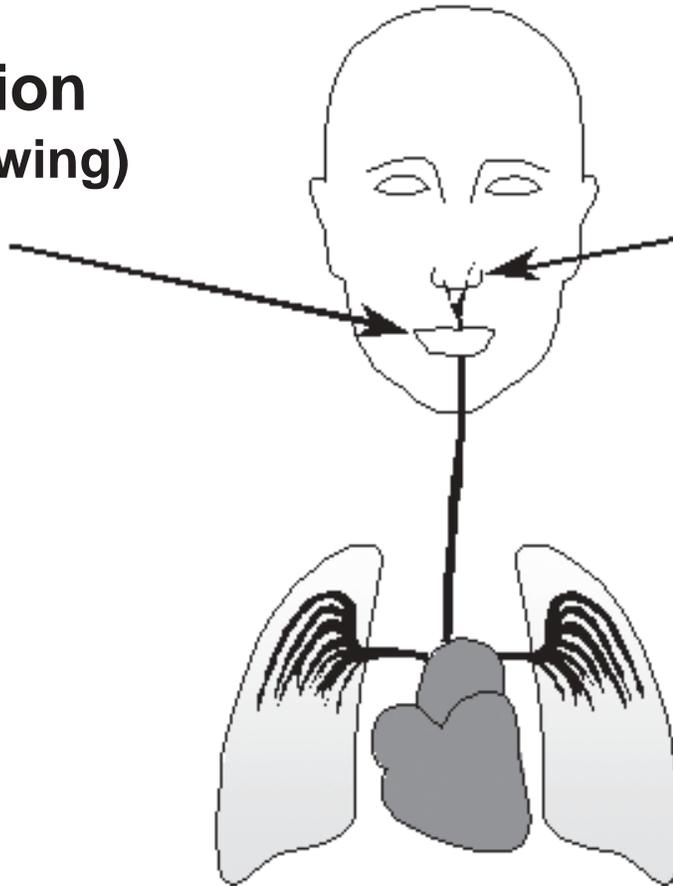
1 ounce or more can
harm an adult



Overhead: Routes of Exposure

**Ingestion
(Swallowing)**

**Inhalation
(Breathing)**



**Absorbtion
(Skin Con-
tact)**





Overhead: Learning about Labels



WORDS ON LABELS THAT MEAN HAZARDOUS

| | |
|----------------------------------|----------------------|
| Caution | Harmful if swallowed |
| Corrosive | Ignitable |
| Danger | Warning |
| Explosive | Poison |
| Flammable | Toxic |
| Keep away from children and pets | |

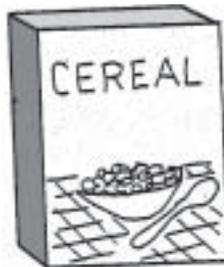
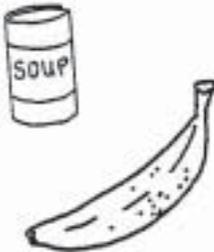
Image courtesy of California Integrated Waste Management Board



Worksheet: Identify the Hazards

Student name: _____

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

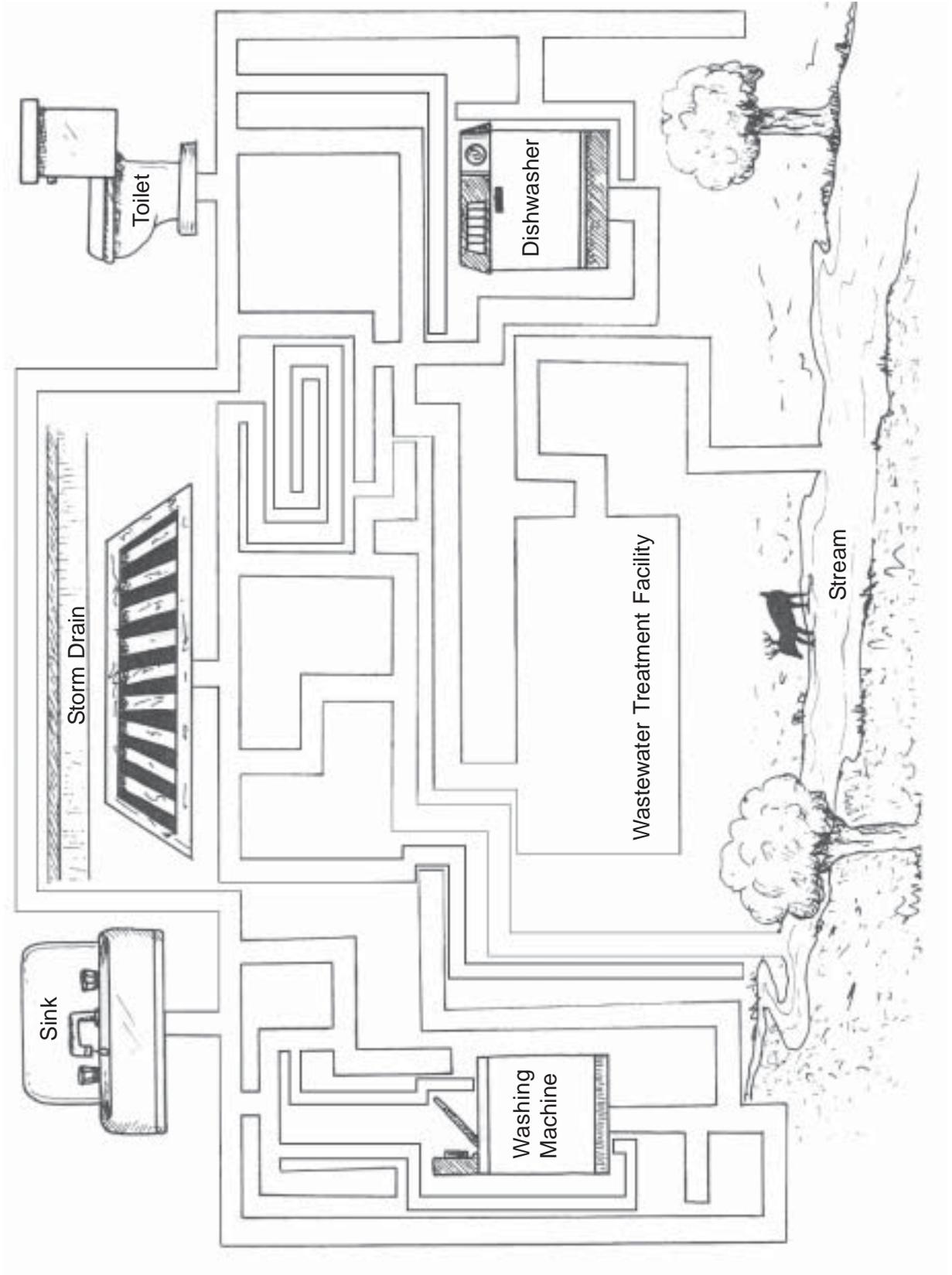




Worksheet: Sink to Stream

Student Name: _____

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





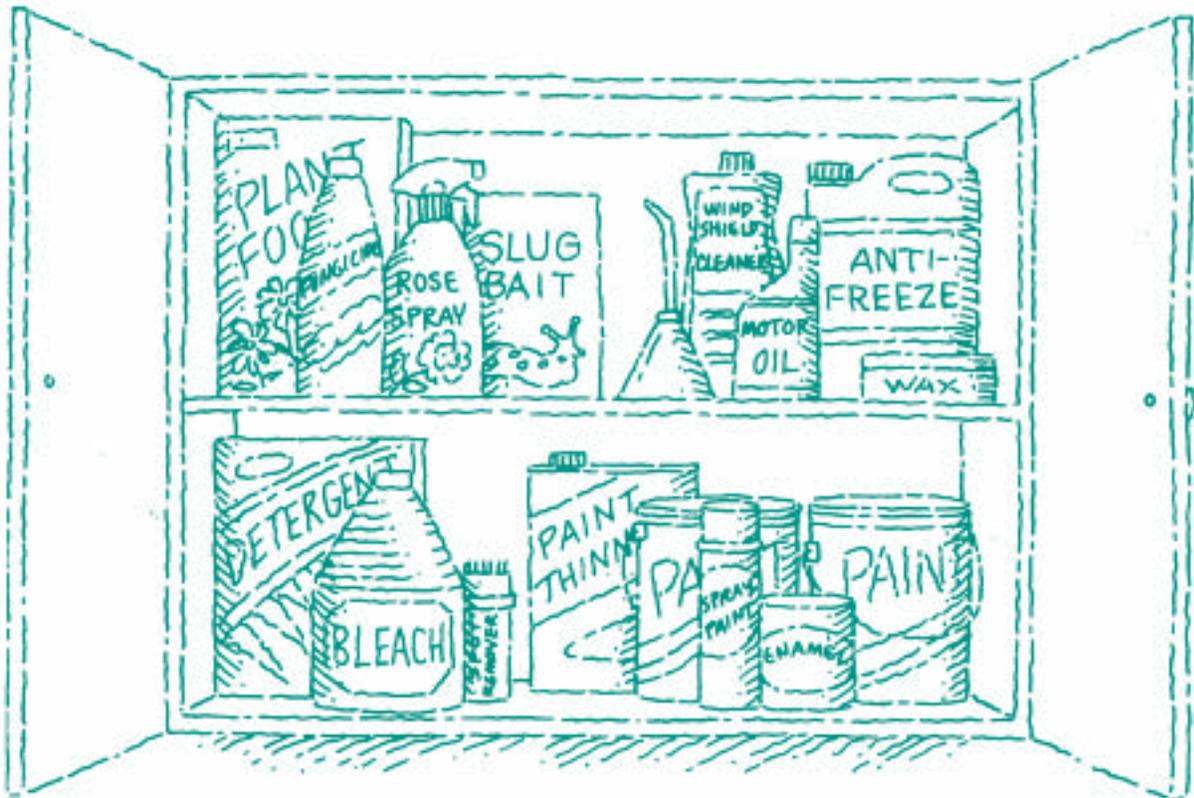
Handout: Tips for a Safer Home

Dear Parent:

Your child has recently been learning about products in the home that are potentially dangerous to people, wildlife and the environment if used or disposed of improperly. The following worksheet has some tips for dealing with chemicals in your home and will help you and your child identify products that should be used and disposed with care.

Safe Use and Disposal Tips

- Always buy the least toxic product necessary to do the job. Avoid products with the words CAUTION, WARNING, DANGER, or FLAMMABLE on the label.
- Buy the smallest container necessary to accomplish your task to avoid having left overs.
- Follow the instructions carefully and try to use up the product as intended or give left overs to someone else who can use it.
- Never pour hazardous products into storm drains or onto the ground.
- Don't mix hazardous chemicals or store them in unlabeled containers.
- Do take hazardous chemicals and cleaners to a household hazardous waste collection center or special collection event.
- Do take used motor oil to a service station or authorized dealers for recycling.
- Contact your local solid waste official to find out how to properly dispose of any questionable materials, if you are not aware of any special collection events or facilities in your area or call the HHW hotline for more information 1-800-732-9253 or 503-229-5913 in the Portland area.





Handout: Safe Substitutes Recipes

Air Freshener

A few cotton balls

Place a few drops of vanilla extract onto the cotton balls and set inside a cup or bowl
Good for the home, car, or refrigerator.



For unpleasant odors:

Boil 1 TBL of white vinegar in 1 cup of water.

Drain Maintenance

1/2 cup of baking soda in the drain

Follow with 1/2 cup of vinegar

Cover and allow to sit for 15 minutes.

Rinse with 2 quarts of boiling water.

Do this regularly to keep drains fresh and to help prevent clogs.



Glass Cleaner

1 quart of warm water

1/4 cup of white vinegar or 2 TBL of lemon juice

Mix and store in a spray bottle. Coffee filters make good glass cleaning rags and can be composted!



Vinyl Floor Cleaner

1 gallon of warm water

1/2 cup of white vinegar or 1/4 cup of borax

Mix in a bucket and mop as you normally would.

Moth Balls

Store wools in sealed plastic bags or airtight containers.

Place garments in the freezer for several days to kill moths or larvae.

Vacuum rugs, carpet and upholstered furniture regularly.

Fertilizer

Amend your soil with a 2/3 soil to 1/3 compost ratio. This will add nutrients, help the soil retain water and keep plants hardy without the use of chemical fertilizers.

Slug Removal

Create slug traps with plastic food tubs. Cut several 1-inch square openings around the tub about 2-3 inches from the bottom. Place tub into the ground so that the openings are just above ground level. Fill tub with 1/2 inch of beer or yeast mixture and cover with lid. Empty every couple of days.

Yeast mixture: 2 TBL flour, 1/2 tsp of baker's yeast, 1 tsp of sugar in 2 cups of warm water.



