



Reducing Product Toxicity *

Activity M.b/H.b

GRADE LEVELS: 7 - 12

OBJECTIVE: To explore options for reducing the toxicity of products.

VOCABULARY: household hazardous waste, green products

MATERIALS: A source of heat for boiling water, baking soda, salt, aluminum foil, tarnished silver.

PROCEDURE:

Ask students to identify some household products that contain ingredients that may be harmful to their health or to the environment. Household batteries contain lead and cadmium, which are both toxic elements. Other examples are turpentine, drain cleaner, chlorine bleach, flea repellent, moth-balls, bug spray, air fresheners, and chemical fertilizer. Discuss with students the problem of disposing of these household hazardous wastes. Help them to understand that these products should not be thrown away in the trash to be landfilled or combusted because the poisonous components could contaminate the environment. Instead, many communities hold special collection drives or have dropoff centers to coordinate the safe disposal of household hazardous wastes. If there is one in your community, take students to see how it is run.

(Note: Do not allow students to run such a collection themselves.)

Emphasize to students that an important way to reduce the problem of household hazardous waste disposal is to use less-toxic products. Explain that nontoxic substitutes exist for many of the products named above. Baking soda, lemon juice, and vinegar are a few common items that can be used instead of many toxic cleaners.

Have students conduct the following experiment to demonstrate the use of a nontoxic substitute for silver polish. If possible, conduct this activity in a laboratory equipped with stations for pairs of students.

Boil 2 to 3 inches of water in a shallow pan with 1 teaspoon salt, 1 teaspoon baking soda, and a sheet of aluminum foil. Submerge a piece of tarnished silverware in the solution and boil for 2 to 3 minutes. Use a cloth to wipe away tarnish. Repeat the procedure if tarnish remains.

Emphasize that all the ingredients they have just used are safe and can be found in their own homes. For some grade levels, you may want to conduct this activity in conjunction with a chemistry unit on ion exchange.

Have students research the use of nontoxic substitutes as alternatives to toxic products. Local organizations such as chapters of the League of Women Voters and local conservation commissions may be able to provide you with information about toxic products and lists of alternatives.

Tell students that the term green products is often used to refer to products that are “environmentally friendly” – don’t harm or unnecessarily pollute the environment. Here are some examples of toxic products and nontoxic substitutes:

Turpentine – Use water with water-based paints instead

Drain cleaner – Plunger; boiling water mixed with baking soda

Flea repellent – Garlic, brewers yeast; herbs such as fennel and rosemary

Mothballs – Cedar chips or herbal sachets

Bug spray (ants and roaches) – Lines of chalk or charcoal dust, talcum powder, and cayenne pepper; borax

Air fresheners – Baking soda, fresh flowers, herbs

Chemical fertilizer – Compost

Remind students that they can also reduce the amount of toxic material they throw away by purchasing reusable products, such as rechargeable rather than disposable batteries.

Have students compile their findings into a bulletin board display or a fact sheet for distribution to the school or community. They might also create a promotional brochure or poster for a local household hazardous waste collection.

Source: U.S. Environmental Protection Agency Let's Reduce and Recycle: Curriculum for Solid Waste Awareness