

Your ECOLOGICAL footprint

Recycling Batteries



FIGURE 1 The Common AA Battery

The alkaline battery was invented in 1959 by a Canadian chemical engineer named Lewis Urry, who was working for Eveready Battery. Alkaline batteries are a type of power cell; they derive power from a reaction between zinc and manganese dioxide (Zn/MnO_2). Since then the alkaline battery has become a ubiquitous feature of modern life. The common AA battery is used in hundreds of everyday products, including flashlights, TV remotes, cameras, toys of all sorts, clocks, radios, and so on (Figure 1). Like most consumer goods, used batteries usually end up in one of two places: a landfill or a recycling center. Batteries sent to landfills pose a number of environmental and human health risks because metals and chemicals in the batteries are released to the soil and water when the sealed batteries are broken.

Recycling batteries reduces these impacts and significantly reduces the amount of energy, wastes, chemicals, and pollutants associated with producing new batteries. To get a sense of these savings, let's look at your battery footprint, focusing only on AA batteries. The first step is to estimate the number of AA batteries you purchase in a year. You will need to inventory all the devices you use at home, in the car, in school, at the office, on vacation, and so forth. Be sure to check all the appliances and other electronic devices you use. Estimate how many you might use in a month, and then multiply by 12 to get an annual total.

A single AA battery contains about 0.8 ounces (23 grams) of zinc. Multiply that quantity times the number of batteries you use in a year.

This is the quantity of zinc you buy each year in the form of batteries. If you threw the batteries in the trash when they died, that also would be the amount of zinc you sent to a landfill.

Table 23.3 shows the reductions in the use of energy and materials due to the recycling of metals, including zinc. These data indicate that recycling reduces energy use by 1,096 Btu per ounce of zinc. Multiply that by the quantity of zinc you purchase to calculate the energy reduction associated with recycling your AA batteries. Table 23.3 also gives the reductions in water use, pollution, and land disturbed associated with recycling zinc. You can calculate your additional reduced footprint from recycling by using that information. (Note: Multiply tons by 32,000 to get ounces.)

STUDENT LEARNING OUTCOME

- Students will be able to discuss the environmental benefits of recycling batteries.

FIGURE 23.16 *Material Processing Wastes* The relative quantities of wastes generated by the extraction and processing of zinc.

(Source: Data from R.U. Ayres, "Metals Recycling: Economic and Environmental Implications," *Resource, Conservation, and Recycling* 21: 145-173.)

