

By Caprice Lawless



## Steps to Responsible E-waste Management at Your School

**W**aste management infrastructure is expanding as we wrestle with how best to gather, sort, and recycle the 50 million tons of e-waste we are generating annually worldwide. Awareness and education are the first steps, followed by programs and industries to address the issue. Schools, districts, and colleges of education contribute their share of e-waste and need to be concerned with its disposal, but they can also put into place their own refurbishing programs and partnerships and use the e-waste challenge as the basis for some real-life problem solving and project-based learning.

For more on refurbishing programs, see *Refurbishing/Redistribution Programs* on page 20. For classroom ideas, see *How Your Classroom Can Help* on page 21. For a comprehensive list of resources mentioned in this article, see *Resources* on page 22.

Being a responsible organization regarding e-waste requires looking into recycling via donating, refurbishing, or repurposing parts. Each solution has its challenges. Here is a five-step process and several resources to help you learn about the challenges and possible solutions to minimizing what technology ends up in landfills.

### Step 1. Educate yourself about local, national, and international legislation.

While recycling standards and certifications are still in the developmental stages, many cities and states are leading the way with ambitious and comprehensive programs addressing the situation. California's landmark Electronic Waste Recycling Act of 2003, for example, requires retailers to collect a fee from consumers on covered electronic devices. The fees are then submitted to the state to pay for recycling efforts.

In February 2008, New York City became the first U.S. city to pass a mandatory producer-responsibility ordinance. The law requires computer, TV, and MP3 manufacturers to take responsibility for the collection of their own electronic products for New Yorkers who discard 25,000 tons of e-waste each year. In January 2008, New Jersey joined California, Connecticut, Maine, Minnesota, North Carolina, Oregon, Texas, and Washington, in passing "take-back" laws requiring manufacturers to collect and recycle e-waste. It is already illegal to dump e-waste in 10 states, with similar legislation pending in many others.

At present, there is not a comprehensive e-waste policy under the umbrella of the U.S. Environmental Protection Agency. Recycling is encouraged but not required for consumers or organizations discarding fewer than 220 lb. of used electronics equipment per month. Waste from facilities generating more are regulated under existing federal statutes governing hazardous waste. For example, dispositioned CRTs must be manifested and sent as "hazardous waste" to a permitted hazardous waste landfill. CRTs sent for recycling from such facilities are also currently subject to federal regulation. The EPA is in the process of streamlining requirements to make it easier and less costly to send e-waste for recycling, and recommends that the best course of action in the meantime is for consumers to abide by local and state guidelines.

Legislation at the international level is moving apace. The European Union passed two Waste Electrical and Electronic Equipment (WEEE) laws addressing the issue. Directives 2002/95/EC and 2002/96/EC limit the total quantity of waste going to final disposal, make producers responsible for taking back and recycling the equipment, and require consumers to return their equipment for recycling, free of charge. Language in the directive also requires the substitution of various heavy metals used in manufacturing for less toxic metals.

Similarly to the way the United Nations' Kyoto Accord would set binding targets to limit greenhouse emissions, the Basel Convention would mandate careful stewardship of e-waste worldwide.

"Greeters" meet visitors at the NextStep recycling/refurbishing facility in Eugene, Oregon.

**Step 2. Investigate recycling options from the companies that sell you equipment.** Many manufacturers offer consumers a percentage off the purchase price of a new piece of equipment upon returning the old one to a retailer such as Best Buy.

In addition, many electronics manufacturers are partnering with retailers such as FedEx Kinko's, Office Depot, Office Max, and Staples to collect used equipment for recycling.

**Step 3. Learn about shredding and sorting and how to certify that recycling is happening.** Environmentalists and waste management equipment experts have begun to join forces to determine how best to collect then dismantle or shred e-waste into a secondary stream of what will be a recovered resource for use elsewhere. Many agree that the elements within the devices are too valuable to languish in landfills. Already technology has been developed that can electronically scan conveyor belts of assorted, shredded e-waste. Once the economics are right, the widespread use of shredding and sorting equipment has the potential to virtually eliminate e-waste.

Ultimately, certification programs are needed to verify environmentally responsible collection, shipment, and processing. Already initial steps have been taken.

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## Refurbishing/Redistribution Programs

Hundreds of nonprofit organizations are collecting used PCs, refurbishing them, and then distributing them to people who need them. It's a plan that benefits greatly from the rapid turnover of high-tech equipment throughout industry, education, and government. While each program differs slightly, the methods and mission of the San Diego Futures Foundation typify how such programs are a win-win for all.

The San Diego Futures Foundation allows one person's trash literally to become another's treasure. Established in 1999, it's an example of how industry, local government, and community nonprofit organizations pool resources and talent to keep hardware in the community.

In the late 1990s, San Diego County began outsourcing its information technology providers, with the largest contract awarded to Northrup Grumman. The foundation was set up specifically to support the community by passing along to it as much of its recently updated equipment as possible.

The foundation collects more than 3,000 PCs and related hardware per year. Some units are refurbished and then redistributed to community members, specifically families with foster children and those in low-income housing. Some are used by residents living in subsidized housing, where on-site computer labs offer training and related technology services.

Through the Foundation's Education Program, students at the city's historic Hoover High School disassemble the units, learn about the components and the function of each, then reassemble them, creating custom-built computers they keep. Instructors teach them how to install open source software, the ins and outs of maintaining a virus-free computer, and how to use the basic programs. At the end of the program, each student makes a PowerPoint presentation describing the work, with autobiographical elements describing his or her own growth in technological expertise through the program. They also produce an updated resume outlining their experience and newly acquired skills.

**For more about organizations that refurbish and/or redistribute used hardware, visit these sites:**

Free Geek (in the Northwest U.S.):  
[freegeek.org](http://freegeek.org)

Goodwill Industries: [www.goodwill.org/page/guest/about/howweoperate/recycling](http://www.goodwill.org/page/guest/about/howweoperate/recycling)

National Cristina Foundation: [www.cristina.org](http://www.cristina.org)

NextStep (Oregon): [www.nextsteprecycling.org/store.php](http://www.nextsteprecycling.org/store.php)

PC Rebuilders & Recyclers (Chicago area):  
[pcrr.com](http://pcrr.com)

San Diego Futures Foundation: [www.sdfutures.org](http://www.sdfutures.org)

TechSoup (clearinghouse for thousands of computer refurbishers, worldwide):  
[www.techsoup.org/recycle](http://www.techsoup.org/recycle)



Pallets loaded with discarded monitors are readied for recycling. Photo courtesy of Lane County Public Works Waste Management Division, Eugene, Oregon.

## How Your Classroom Can Help

Because the e-waste solution will touch on behavior modification, business, public information, ethics, scientific methods, environmental science, and politics, the fodder for interdisciplinary classroom projects is limitless.

Here are some possible lines of inquiry for WebQuests, collaborative research projects, and blogs that might all carry an e-waste solution theme. In addition to the resources listed at the end of this article, below are additional ones that can help with classroom activities.



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- What is inside my computer, and what is it worth in today's market?
- What is the electronics industry doing to address e-waste?
- What is the waste management industry doing to address e-waste?
- How are electronics recycled in my school and in my community?
- What happens to e-waste after we take it to our local e-waste recycling center?
- Which local, state, and federal agencies verify or certify that e-waste is being properly recycled?
- What can our school do to spread the word about e-waste recycling?
- What can I do with my own e-waste at home to be a responsible global citizen?
- How does e-waste at our school affect our school's carbon footprint?

### Resources

Basel Action Network: [www.ban.org](http://www.ban.org)  
European Union Environment Program: [ec.europa.eu/environment/waste/weee/index\\_en.htm](http://ec.europa.eu/environment/waste/weee/index_en.htm)  
Greenpeace: [www.greenpeace.org/usa/news/where-does-all-the-e-waste-go](http://www.greenpeace.org/usa/news/where-does-all-the-e-waste-go)  
International Association of Electronics Recyclers: [www.iaer.org/search/iaersearch.cfm](http://www.iaer.org/search/iaersearch.cfm)  
Mother Earth News: [www.motherearthnews.com/Nature-Community/2007-06-01/How-to-Recycle-an-Old-Cell-Phone.aspx](http://www.motherearthnews.com/Nature-Community/2007-06-01/How-to-Recycle-an-Old-Cell-Phone.aspx)  
National Geographic Society: [news.nationalgeographic.com/news/2005/11/1108\\_051108\\_electronic\\_waste\\_2.html](http://news.nationalgeographic.com/news/2005/11/1108_051108_electronic_waste_2.html)  
Union of Concerned Scientists: [www.ucsusa.org/publications/greentips/1104-what-to-do-with-old-electronics.html](http://www.ucsusa.org/publications/greentips/1104-what-to-do-with-old-electronics.html)  
World Watch Institute: [www.worldwatch.org](http://www.worldwatch.org)

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“We hold an e-cycling event at our Back-To-School Night in the fall,” said Steve Taffee, an ISTE Special Interest Group Technology Coordinator member from Castilleja School in Palo Alto, California. Through its partnership with community members, the school is recycling 1,000 units per year.

The International Association of Electronics Recyclers (IAER) has a certification program for responsible recycling, conducting third-party audits of electronics recycling facilities.

**Step 4. What others are doing.** An informal poll of two of ISTE’s special interest groups, reveals widely varying e-waste solutions enacted by school districts. They are limited, in many cases, by the recycling resources available to them. Members of the Special Interest Group for Technology Coordinators (SIGTC) and the Special Interest Group for Computing Teachers (SIGCT) report that some schools, like the University of Northern Iowa, sell used equipment at an auction three times a year, according to Associate Professor Leigh Zeitz. Director of Technology Pamela McLeod said the board policy in her New Hampshire school district requires they first attempt to sell old equipment, and then donate it to schools, libraries, or nonprofits before discarding it. “Our town transfer station accepts electronic equipment for e-waste recycling, so that is our preferred method of disposal,” she said. Like many others in her position, she is recycling some equipment for which there is no market. “This year we are recycling about 40 old CRT monitors for which we were not able to find a seller or a donation recipient,” McLeod added.

Many schools, such as the Mount Carmel Academy in New Orleans where SIGTC member Russel Deroche Jr. teaches, donate usable equipment to a local charity and send the rest to a recycling firm. Educators in the San Francisco Bay Area have available to them some of the most aggressive and thorough recycling firms such as Green Citizen. That’s the firm partnering with the Castilleja School,

according to SIGTC member Steve Taffee. His school recycles about 1,000 units a year, and its recycling effort also extends to the larger community.

“We hold an e-cycling event at our Back-To-School Night in the fall,” he explained. “Parents can drop off certain items that we can recycle for free at Green Citizen; very popular. The tech department also takes laptops, monitors, TVs, cell phones, toner cartridges, and batteries at any time of year for e-cycling,” Taffee added.

It’s illegal to donate used equipment directly to charity in the state of Iowa, according to SIGTC member Gordon Dahlby. “School equipment is, at face value, owned by the taxpayers. One must either sell it to the highest bidder, set a fair market value to sell it to the public (which could be purchased by nonprofits), or dispose of it by lot or bid,” he explained. Dahlby also mentioned that the donation of used equipment may be disallowed in some states, because it might appear to be donating to poor families at the exclusion of any particular group of taxpayers. “The slippery slope is identifying needy families and also not incurring any future support costs once the units are out of district control,” he said.

Wayne Burnett, primary ICT specialist and coordinator of learning technologies at the German European School in Singapore, had an even more startling situation, “We looked at an orphanage the school is supporting in nearby Bintan Island, Indonesia. The offer was turned down because they do not have electricity. That might be a problem for a few international schools,” he added. In Singapore, he had the opposite problem: The charities there had notable requirements in terms of operating systems, and so they, too, were uninterested in his used equipment.

**Step 5. Put together your plan for responsible e-waste management.** After educating yourself and stakeholders about applicable e-waste legislation and researching local recycling opportunities, consider viable solutions for your organization. Keep in mind partnerships locally and internationally and involve the whole community in the solution.

## Resources

### Videos

Hewlett-Packard video showing how electronic scanning of sorted e-waste works: [hpbroadband.com/\(S\(zzafvv550kpzre55rosjwh2x\)\)/program.aspx?key=7JVQ93ORQO](http://hpbroadband.com/(S(zzafvv550kpzre55rosjwh2x))/program.aspx?key=7JVQ93ORQO)

Riverside Waste Machinery: [www.wastemachinery.co.uk/video\\_electronic\\_scrap.asp](http://www.wastemachinery.co.uk/video_electronic_scrap.asp)

SSI Shredding Systems: See how easily large items such as printers, copy machines, and even entire Volkswagens are shredded: [www.ssiworld.com/watch/watch-en.htm](http://www.ssiworld.com/watch/watch-en.htm)

### Web sites

Apple: [www.apple.com/environment/recycling/nationalservices/us.html](http://www.apple.com/environment/recycling/nationalservices/us.html)

Basel Convention: [www.basel.int](http://www.basel.int)

California Waste Recycling Act of 2003:

[www.ciwmb.ca.gov/electronics/Act2003](http://www.ciwmb.ca.gov/electronics/Act2003)

Dell: [www.dell.com/content/topics/segtopic.aspx/dellrecycling?c=us&cs=19&l=en&s=dh](http://www.dell.com/content/topics/segtopic.aspx/dellrecycling?c=us&cs=19&l=en&s=dh)

Electronics Industries Alliance: [www.eiae.org](http://www.eiae.org)

European Union: [ec.europa.eu/environment/waste/weee/index\\_en.htm](http://ec.europa.eu/environment/waste/weee/index_en.htm)

Greener Computing (international clearinghouse tracking industry efforts): [www.greenercomputing.com](http://www.greenercomputing.com)

Hewlett-Packard: [www.hp.com/hpinfo/globalcitizenship/environment/recycle](http://www.hp.com/hpinfo/globalcitizenship/environment/recycle)

International Association of Electronics

Recyclers: [www.iaer.org](http://www.iaer.org)

Microsoft: [www.microsoft.com/Education/TenTips.msp](http://www.microsoft.com/Education/TenTips.msp)

National Electronics Recycling Information Clearinghouse: [www.ecyclingresource.org/ContentPage.aspx?PageID=](http://www.ecyclingresource.org/ContentPage.aspx?PageID=)

TakeBack Coalition: [www.computertakeback.com](http://www.computertakeback.com)

U.S. EPA: [www.epa.gov/epaoswer/hazwaste/recycle/ecycling/rules.htm](http://www.epa.gov/epaoswer/hazwaste/recycle/ecycling/rules.htm)



Caprice Lawless, former senior editor for L&L, has been editing scientific and educational publications for 20 years.