

ELECTRONIC WASTE AND CHINA

Introduction

Focus

Like most developed countries, Canada produces enormous amounts of electronic waste, or e-waste. Much of this waste ends up either in landfills in Canada or in primitive recycling operations in Third World countries. This *News in Review* module visits one such operation and explores the size of the e-waste problem and some ways in which it might be reduced.

Further Research

The Basel Convention's Web site is www.basel.int.

Canadians are addicted to their electronic toys. They spend millions of dollars every year on electronic devices ranging from digital cameras to computers, video games to HD televisions. Statistics Canada, the government organization that tracks who we are and how we live, estimates that Canadians spent \$880-million in 2004 on electronics.

This expenditure is the most obvious sign of what has become our addiction to the newest and the latest. We want new products with the latest features—even if our current computer or cell phone works perfectly well. We are replacing our electronic equipment faster than ever before. And the electronics industry is thriving on this planned obsolescence.

Computers are only one example of this rapid turnover. Just a few years ago, computer owners replaced their machines on average every three or four years. Now the average Canadian computer is only 2.5 years old, and 25 per cent of computer owners replace their machines annually.

What happens to the electronic equipment we replace every year?

According to Environment Canada (www.ec.gc.ca), Canadians dumped more than 160 000 tonnes of e-waste in 2002 alone. This consisted of computer equipment, phones, televisions, stereo equipment, and small appliances. Most of this went to Canadian landfills. Environment Canada describes this amount of waste as the equivalent of about 336 000 full-sized pick-up trucks. It predicts that, unless things change, this amount will rise to 206 000 tonnes by 2010, which would be enough e-waste to fill 430 Olympic-size swimming pools.

But it's not just the amount of e-waste that is the problem; it's also the toxic

metals and chemicals that the waste contains. According to Statistics Canada, this includes 4 700 tonnes of lead, 4.5 tonnes of cadmium and 1.1 tonnes of mercury. All of these are known to be serious threats to health.

Not all of the landfills are in Canada. As early as 2002, the CBC television program *Marketplace* turned up Canadian computers in a Chinese landfill (some were from the Department of National Defence!).

In 2006, a federal government investigation found 50 shipping containers in Vancouver filled with 500 000 kilograms of plastic and metal waste destined for China and Hong Kong. Much of it was toxic computer waste. Its origin could not be precisely determined, but it seemed to come from a mixture of private and public—including government—sources in Ontario and Quebec.

The Basel Convention

International trade in e-waste is not supposed to happen. In 1989, a number of countries negotiated the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. The Convention came into effect in 1992, and 170 countries have signed the agreement. Unfortunately, not all of them have fully ratified the agreement as amended in 1996. Among those countries are Canada and the United States.

The Basel Action Network (BAN), an independent organization based in Seattle, Washington, is dedicated to monitoring the implementation of the Basel Convention. BAN has little nice to say about the work of either Canada or the U.S.

Further Research

A description of provincial regulations dealing with e-waste disposal is available at www.greensupplyline.com/howto/197007195.

“In the U.S. and Canada, the laws governing the export of trade in hazardous electronic waste are tragically inadequate, and thus these two countries are the primary sources of the global crisis. The U.S. is the only developed country in the world that has failed to ratify the 1989 Basel Convention, an international treaty controlling trade in hazardous waste from richer to poorer countries. In 1995, that treaty adopted a full ban on exports from rich to poorer countries. Both the U.S. and Canada actively oppose this prohibition. In Canada, the Basel Convention is not properly implemented, allowing almost all e-waste to flow abroad freely. In both countries, then, it is perfectly legal for businesses to maximize profit by exporting toxic electronics to developing countries, even when this export is a violation of the laws of importing countries. The export of toxic electronic waste to developing countries disproportionately burdens them with a toxic legacy and allows for externalization of real costs” (www.e-stewards.org/ewaste_crisis.html).

Along with Australia and New

Zealand, Canada and the U.S. appear on BAN’s “Hall of Shame” as “actively working to undermine the Basel Convention’s Ban Decision and Amendment designed to end the dumping of hazardous wastes from rich to poorer nations” (www.ban.org/main/hall_of_shame.html).

E-waste from Canada continues to be exported to other countries—even to countries that, like China, specifically ban its import from abroad. The actions of some Canadian recycling companies are in clear violation of Chinese law. Some e-waste still makes its way from Europe to developing countries. However, the European Union has enacted strong national laws to deal with e-waste domestically and to prevent its export. Neither Canada nor the United States has done so. In both countries it is left to the individual provinces or states to deal with the problem.

The video that accompanies this story describes the problems that have resulted in one community only: Guiyu, China. But this scene is repeated in other communities in China, Pakistan, India, and at least three African countries.

For Discussion (and, hopefully, Action!)

At some point in the very near future, all of us are likely to have to dispose of a piece of electronic equipment. Many experts have made the point that consumers should be very skeptical when they give up such equipment for recycling, even to non-profit organizations and charities. Do you know a responsible recycling company in your area? Does your school have one it uses that it has vetted and could recommend? If not, would you and your classmates commit to locating such a recycling company and promoting its use in your community? How might you go about locating such a company?

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Video Review

Further Research

The CBS program *60 Minutes* devoted a segment of one of their programs to the e-waste problem in Guiyu. That segment, "The Wasteland," is available online at www.cbsnews.com/video/watch/?id=4586903n.

Answer the questions in the spaces provided.

1. On what "industry" does Guiyu's economy depend?

2. On what industry did Guiyu's economy depend 20 years ago?

3. What group does most of the "dirty work" in Guiyu?

4. What percentage of the children in Guiyu have high levels of lead in their blood? _____%
5. Why are illegal recycling methods permitted in Guiyu?

6. When did the Basel Action Network (BAN) first expose the situation in Guiyu?

7. What resulted from the exposés by BAN and Greenpeace?

8. What metal is collected when circuit boards are burned?

9. Where does most of the e-waste enter China?

10. How much e-waste is shipped annually to Mainland China?

11. From where is most Canadian e-waste shipped? _____
12. Where did the Technotrash representative say their containers of e-trash were headed? _____

Where did they end up? _____
13. How many containers did Environment Canada and Canada Customs inspect in 2006, their "best enforcement year"? _____

How many companies were fined as a result? _____

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E-Garbage: The Problem in Guiyu

Guiyu is only one of a group of Chinese towns where there has been an ongoing problem with electronic waste.

In 2000, China specifically banned the import of electronic waste, recognizing that it had a problem in some parts of the country. Recycling practices in these areas were clearly unsound. But this action failed to stop the illegal trade in these goods.

This failure was highlighted in 2002, when the Basel Action Network (BAN) released a documentary film titled *Exporting Harm*. The film focused on Guiyu, which is in Guangdong Province, very close to the port of Hong Kong. The film showed entire families working to extract valuable components from old electronic equipment—and doing it using the most primitive methods available.

Typical of the methods used are acid baths and open fires, which result in toxic fumes and acid spillage. Many toxins end up in landfills, where they leach into the ground and the water supply. Drinking water for Guiyu has to be trucked in from over 30 km away.

A typical study of Guiyu's recycling operation found that dust in the roads around the e-waste operations contained 370 times more lead than samples taken 30 km away. It also found that lead levels in the town's school grounds were up to six times the limit allowed for Canadian schools.

Other recent studies have shown that the air near the salvage operations has the highest amount of dioxin, a suspected carcinogen (cancer-producing product), measured anywhere in the world. The soil, in turn, is saturated with it. The blood of the workers contains high levels of flame retardants; so do plants and animals in the area.

The size of the salvage operation in Guiyu is enormous. About 150 000 people are involved in the business. Typically, they are paid anywhere from \$2 to \$4 per day.

More recent investigations by BAN in 2004 and Greenpeace in 2005 have shown that illegal recycling continues, despite efforts by the Chinese government to bring it under control. There are a number of reasons why this is so.

- China needs the raw materials that salvage provides for its manufacturing sector, so many officials turn a blind eye to these illegal imports.
- Hundreds of thousands of people are employed in the industry and make a difficult living from it.
- Local governments and police benefit from the industry and actively protect local entrepreneurs from prosecution.
- The disposal of used electronic equipment remains a real problem for many Western countries. Often they turn a blind eye to the kind of practices they say they deplore. It is estimated that 70 per cent of the world's discarded computers and electronic equipment makes its way to China.
- It is far cheaper for industrialized countries to send e-waste abroad for recycling than for them to do it at home. Properly recycling a typical Canadian computer costs about \$45. Sending it as part of a container shipment to China is about 10 per cent of that cost.
- Criminal groups are believed to be involving themselves in the illegal export of e-waste. Criminal Intelligence Service Canada (www.cisc.gc.ca) predicts that organized crime will

become even more involved, as North Americans replace their television sets with new high-definition models.

Meanwhile, China pays a huge environmental price for allowing operations like those in Guiyu to continue. The World Bank has estimated that pollution and other environmental damage cost the Chinese economy about 12 per cent of their Gross Domestic Product (GDP) every year. The bulk of these costs are medical, followed by damage to agriculture and marine environments.

The central government in Beijing has set environmental goals and tried to bring pollution and dangerous practices under control. They even tried to establish what they called a “Green

GDP” to measure the environmental progress in each province. Unfortunately, this program met with significant resistance—several provinces simply failed to co-operate—and the program has proven unsuccessful. The lack of co-operation by the provinces was compounded by infighting among the various government departments responsible for implementing the plan—a not uncommon problem in Chinese bureaucracies.

Finding a solution to the problems in Guiyu will not be simple. However, one thing is clear: if Western nations take responsibility for their own e-waste, the salvage industry in Guiyu will have far fewer raw materials with which to work.

For Discussion

The Basel Action Network (BAN) and Greenpeace brought the plight of Guiyu to the world’s attention, but the primitive recycling of electronic goods continues with protection from local officials. If the Guiyu recyclers are ultimately put out of business, what do you think will cause this? Will it be international pressure or a determined crackdown by the Beijing central government? What should Canada’s role be in resolving this serious global environmental problem?

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A Global Problem

Electronic waste is a problem everywhere. Wealthy industrialized countries produce the bulk of it (although all countries produce some). In many cases, however, the poorest peoples in the world end up having to deal with it.

Canada produces a huge amount of e-waste: 160 000 tonnes. But this is nothing compared to that produced by some other countries.

The United States, as one might expect, is the world leader in the production of e-waste. The U.S. Environmental Protection Agency (www.epa.gov) reported that between 1.4 and 1.7 million tonnes of computers, televisions, VCRs, monitors, cell phones, and other electronic equipment were discarded in 2005.

The British periodical *New Statesman* (February 5, 2007) reports that the average British household has about 25 electrical products and throws away five of them every year. This results in one million tonnes of e-waste every year. The amount is currently growing at a rate of five per cent per year. In fact, worldwide, e-waste is increasing faster than any other type of waste.

Dealing with all of that waste is a tremendous problem. It is only recently that most jurisdictions have taken a hard look at what they can do to see that e-waste ends up in places other than landfills. The European Union, in particular, has developed tough new regulations to ensure that unwanted electronic equipment is either reused or recycled in its country of origin. The U.S. and Canada, unfortunately, have been dragging their heels—both in developing national recycling policies and in preventing the shipments of these wastes to other countries.

Making It “Go Away”

For some time, e-waste from North America and Europe has made the trip to countries like China and India. Unscrupulous recycling firms have been able to make a quick profit by dumping their old electronics there. Now those countries are beginning to develop their own large appetites for electronic goods—and their own landfills of e-waste. Most domestic waste ends up treated like foreign waste: recycled by hand in unsafe facilities. In India, for example, only one per cent of e-waste ends up going to qualified, authorized recycling facilities.

Africa has now become one of the new destinations for e-waste, but with a bit of a twist. The Basel Action Network (BAN) has been studying shipments of computers to Africa, specifically through the Nigerian port of Lagos. It has determined that about 400 000 used computers a month travel through the port.

The computers are usually officially described as good-quality, second-hand equipment. Many of them are donations made through charitable agencies. But often the containers are filled with non-functioning CPUs, cell phones, and televisions—e-waste. Working with local experts, BAN has determined that anywhere from 25 to 75 per cent of any shipment is likely to be e-waste (www.ban.org/BANreports/10-24-05/documents/ExecutiveSummary.pdf).

These shipments are not pre-tested to see if the equipment is actually functional. As a result, no one can say with certainty that e-waste smuggling is taking place, but the signs seem to point that way.

Further Research

A fine article on the shipment of e-waste to African destinations is available online from Environmental Health Perspectives at www.ehponline.org/members/2006/114-4/spheres.html.

Further Research

An excellent presentation on the shipment of e-waste to Africa, including a video, is available from Consumers International at www.consumersinternational.org/Templates/Internal.asp?NodeID=97534.

The centre of Nigeria's computer industry is the Ikeja Computer Village. (At the end of November 2008 it was shut down by the government, which accused its vendors of failing to pay their personal income taxes.). Dealers there report that close to 75 per cent of the electronics shipped to them are irreparable junk. This e-waste all ends up in landfills—landfills that are often informal dumps by the sides of roads or in vacant lots. Nigeria has no capacity for recycling e-waste; the environmental damage is significant.

Ghana is another country with experience in used computer shipments. Traders there report that exporters force them to take all kinds of junk in order to receive a shipping container with a few computers that actually work. Like Nigeria, Ghana has no recycling facilities.

In August 2008, Greenpeace published a study of e-waste shipments to Ghana (www.greenpeace.org/raw/content/international/press/reports/poisoning-the-poor-electronic.pdf). The report helps us understand how widespread

this problem has become. "In Ghana, the Greenpeace team documented e-waste from European, Japanese, and U.S. brands, including: Philips, Sony, Microsoft, Nokia, Dell, Canon, and Siemens. Labels revealed the equipment came from a range of organisations such as Den Kongelige Livgarde—the Danish Royal Guard, and the U.S. Environmental Protection Agency. The team saw containers of e-waste from Germany, Korea, Switzerland, and The Netherlands being opened at Tema harbour, the biggest port in Ghana. The container numbers revealed that all the European containers had been shipped via Antwerp in Belgium."

Okechukwu Ibeanu, of the UN Human Rights Council, has a clear understanding of why Third World countries accept these conditions: "Many developing countries, despite sometimes knowing the dangers of the waste, continue to accept hazardous products and toxic waste due to poverty and the quest for development" (www.cbc.ca/news/story/2008/06/26/electronic-waste.html).

For Discussion

1. Ultimately, who has to be responsible for stopping the international trade in e-waste: the nations that produce the waste or the countries that receive it? Would it be easier to stop shipments at ports of exit or ports of entry? Should the producer nations—and they are the wealthier nations—be willing to assist in both ports?
2. If the biggest producers of e-waste like Canada, Australia, and the U. S. refuse to agree to a complete ban on the export of e-waste, how likely to succeed are international attempts to stop the trade?
3. Is there anything that individuals can do to reduce this e-waste problem? Describe fully.

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Solutions: Government and Industry

Further Research

An article describing some Canadian corporate programs for handling e-waste is available at www.canada.com/topics/technology/story.html?id=b1436790-1a5b-4d8b-a141-e5e12a8d1eeb.

Note

Another example of an environmentally responsible recycler is Free Geek Vancouver. It publishes its recycling principles at http://freegeekvancouver.org/en/computer_recycling_principles.

Did you know . . .

Greenpeace has developed a ranking system for major electronics companies to report how environmentally friendly their products are. The listing is updated every three months. The list is available online at www.greenpeace.org/international/campaigns/toxics/electronics/how-the-companies-line-up.

The solution to the electronic waste problem should be relatively straightforward. “According to University of Toronto professor Douglas MacDonald, consumers (including individuals, corporations, and government institutions) can do two things to help the environment: one, create cleaner and more efficient technology; and two, change their behaviour” (www.cbc.ca/news/background/environment/e-waste.html).

Corporate Solutions

Corporations can help eliminate the problem by changing the way they manufacture electronic products and by making them easier to recycle once they have outlived their usefulness.

Changing the manufacturing process involves finding ways of using fewer toxic substances in the process.

Manufacturers in the European Union are already subject to legislation banning some of the more commonly used toxins and are developing new manufacturing methods as a result.

Other manufacturers are concentrating more on the recycling process. Some companies in North America are already accepting the return of their used products for recycling. European companies are now required to do so by law.

As manufacturers become responsible for their own recycling, it is expected that they will use more easily recyclable materials in manufacturing and make it easier to dismantle their products at the end of their lives. One computer company in Asia is even experimenting with a bamboo casing for its laptops to replace the much more harmful plastic it used in the past.

But perhaps the most positive step that manufacturers could take is to reduce the amount of planned obsolescence built into electronic equipment. Two ways in which this can be done are:

1. Make electronic equipment easier to service than at present. It is often easier and cheaper to replace a product than to repair it. Some electronic items even come in sealed cases that cannot be opened for servicing.
2. Design equipment that can be readily upgraded as new and improved features are developed. Electronic equipment should be able to last more than two or three years before it becomes obsolete.

Corporations also have a responsibility to ensure that their recycling is done by reliable companies that will not pass waste on to Third World nations. More and more of these companies are appearing in Europe and in North America. Some, like Xstrata Copper of Rouyn-Noranda, Quebec, the world’s largest consumer of e-scrap, are extremely successful. Xstrata smelts shredded circuit boards to extract the copper—and obtains the boards far more cheaply than normal copper scrap.

Government Actions

Governments also have a major role to play in decreasing the amount of e-waste that finds its way into landfills both at home and abroad. The members of the European Union have had to comply with a Waste Electrical and Electronic Equipment directive (WEEE), which requires them to take back their products for recycling. Local authorities set up designated depots for the return of WEEE items, and the corporations pay for their operation.

Further Research

For information on the Alberta recycling program, go to www.albertarecycling.ca; for Nova Scotia, www.acestewardship.ca; for British Columbia, www.env.gov.bc.ca/epd/recycling/electronics/plan.htm; for Saskatchewan, www.swepit.ca.

Although there is no federal program in Canada to ensure the recycling of e-waste, several of the provinces have taken the lead in developing new plans. The Alberta program is typical of most. It imposes an up-front fee at the time of purchase that will be used to pay recycling costs when the equipment is junked. Used equipment can be taken to a number of sites around the province.

Ontario has adopted a somewhat different approach. It collects its fees from manufacturers, importers, and assemblers of the electronic products, rather than from the consumers. As in Alberta, the funds raised are used to establish collection centres where the products can be returned for proper recycling.

Ontario has chosen to charge producers rather than consumers in the hope that this will encourage them to use more environmentally sustainable manufacturing processes. If the cost of recycling a company's products is reduced, the fees it pays for recycling will also be reduced.

But governments also need to deal with the problem of e-waste shipments

to other countries, and this is a federal responsibility. Under the Basel Convention, Canada has agreed to help restrict these shipments, but its record is spotty at best. Along with major e-waste producers like Australia and the U.S., Canada continues to refuse to sign the amendment banning outright the export of e-waste. As we have learned from the video, unless it significantly increases its inspection of shipping containers bound for Asia and Africa, much of the e-waste destined for those areas will continue to make its way there.

The Ultimate Solution?

Perhaps the best way to end this section is with the same CBC backgrounder we used to open it, and the words of Douglas MacDonald. "Repairable and replaceable products, planned durability, legislation restricting toxic elements, and waste planning are essential in dealing with the global e-waste dilemma, environmental experts say. But the real change will come when, simply put, we find other ways to find happiness and self-esteem than through the purchase of a product."

To Consider

Douglas MacDonald seems to believe that our addiction to the new and the latest is at the root of our e-waste problems. Do you agree with him that insatiable consumer demand for self-satisfaction is the real cause of the rapid growth of e-waste in Canada and other countries? Or do you blame the manufacturers and developers for creating this constant demand for "bigger and better" products? What can you and your peers do to reduce the problem?

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Solutions: Personal

What can we do as individuals to help reduce the quantity of e-waste that finds its way into landfills here and abroad? The answer is that we can do a great deal, should we choose to.

The CBC has published several sets of suggestions in articles on its Web site. Some of these offer ways in which consumers can encourage the development of greener electronic equipment. Others make suggestions about what to do with outdated equipment when it comes time to recycle it.

Greener Gadgetry

If you want to see the development of more environmentally friendly electronic equipment, do the following:

- Write your local, provincial, and federal legislators, asking for a universal, state-regulated eco-labelling system for all consumer products.
- Don't throw discarded electronics in the garbage. Take them to recycling facilities if they exist in your province or territory. As of December 2008, Alberta, Saskatchewan, Nova Scotia, British Columbia, and Ontario have e-waste recycling.
- Lobby your province or municipality to introduce an electronics-recycling program if it doesn't have one.
- Before purchasing any electronic or electric equipment, check out how the leading manufacturers rank environmentally in Greenpeace's Guide to Green Electronics.

Sources: Updated from www.cbc.ca/news/background/consumers/green-gadgetry.html. The Greenpeace Guide to Green Electronics is available at www.greenpeace.org/international/campaigns/toxics/electronics/how-the-companies-line-up.

The Three Rs

When it comes time to update or replace your electronic equipment, follow the three Rs: Reduce, Reuse and Recycle. Once again, the CBC Web site (at www.cbc.ca/news/background/environment/e-waste.html) provides assistance by offering the following suggestions from Environment Canada, adapted slightly for this article:

- If possible, upgrade your computer and other electronic or electric goods rather than replace them. If an item is working well, maybe the time to replace it hasn't arrived yet.
- Check with the equipment's manufacturer to find out about product take-back policies and programs.
- Instead of throwing it out, donate your old computer equipment to a family member, friend, or a charitable organization that can put it to use. Go to www.rebootcanada.ca to find a recycling location (or school computer program). Other organizations that may be interested include Computers for Schools (cfs-ope.ic.gc.ca) and World Computer Exchange (www.worldcomputerexchange.org).
- Find an organization in your community that accepts old computer equipment for refurbishing (but check its credentials to make sure unusable items or components are actually recycled).
- Check with your local computer store or municipality to learn about disposal or recycling options in your area.
- Increase your community's awareness of the issue by passing this information on to friends and neighbours.
- Make your local technology supplier aware of your desire for pollution-preventative products.

Further Research

About.com has an article with suggestions on how Canadians might go about recycling a computer at <http://sbinfocanada.about.com/od/environmentbiz/a/comprecycling1.htm>.

A Contribution Above and Beyond

If you have the right skills, your contribution can be especially significant. Alex, a 15-year-old from Westerly, Rhode Island, was inspired to take action by an article he read five years ago on e-waste. With some of his friends he founded a group called Westerly Innovations Network (WIN – <http://w-i-n.ws>). Alex and his fellow WIN members repair and update recycled

computers and then donate them to schools and individuals.

In one day, WIN collected 10 tonnes of electronic equipment for recycling. Over the past five years they have refurbished more than 300 computers and donated them to countries around the world. Branches of WIN have now been formed in other countries, including Mexico and Cameroon.

This is pretty impressive action by a small group of concerned teenagers.

Action

1. Which of the above suggestions for reducing e-waste do you think is likely to be most effective? Why?
2. Exactly how many electronics products are there in your own home? What do you do with them when they are broken or no longer required?

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Activity: Where Do Old Electronics Go?

Your school is likely filled with electronic equipment, and much of that equipment is probably discarded and replaced on a regular basis. What happens to the old equipment once it leaves the school?

It may be that your school has little say in where the equipment ends up; the decision may be made by a local school board or a provincial government. Somewhere, however, there will be a written policy on how electronic equipment should be disposed of. A copy of that policy is likely on file in the school office.

1. Begin by requesting a copy of the policy (you may have to ask your teacher to help you obtain this).
2. Does the policy clearly describe the conditions required for the school to declare a piece of equipment surplus?
3. Does the policy specify what should happen with each type of electronic equipment: televisions, VCRs, DVD players, computers, phones, etc.?
4. Does the disposal policy follow the Three Rs: Reduce first, then Reuse, finally Recycle? Especially important: is a new use found for any equipment that is surplus to the needs of the school, but still functioning properly?
5. Does the policy allow functional but surplus equipment to be passed on to other users or to be resold?
6. If the equipment is no longer working, are there provisions in the policy that will assure that it will be properly recycled?

Once you have reviewed the answers to these questions, can you say that you are comfortable with the procedures that your school or school board has in place for the disposal of electronic waste? Are there suggestions you would like to make to improve the policy?

In light of what you have learned about the e-waste problem, write a brief letter summarizing your assessment of the school's policy on the disposal of e-waste and suggesting any changes or improvements you feel should be made. Address the letter to your principal.