



Core units: Exemplars – Year 9
Illustration 4: E-Waste

E-waste: An introduction

Australians love their electronics. They are not just common, they are also relatively cheap. Millions of phones, computers, keyboards, modems, game consoles, televisions, iPads, iPods, mp3 players, mobile phones, scanners and printers are in our homes, work places and schools. We buy them in the full knowledge that they will be outdated and replaced within two or three years. But where do all these electronic devices go once we are finished with them? You might be surprised at the answer. Ideally, they would come back as new models after recycling. However, the sad reality is that most units end up in landfills.



An all-too-typical scene at tips around Australia

Source: © Mark D Manuel.

The size of the problem in Australia and worldwide is staggering. Consider the following:

- each year Australians purchase three million new computers
- the typical Australian computer has an active life expectancy of three years
- only about 1.5 per cent of computers are recycled
- there are 8.5 million Australian households and the average Australian home has 2.2 television sets
- seventy per cent of households have bought a new television in the past three years
- only 32 per cent of replaced televisions are recycled
- only three per cent of mobile phones are recycled
- our e-waste is growing at three times the rate of all our other rubbish.

There are some significant issues associated with our use of electronic devices in such huge numbers. Consumption decisions have a direct impact upon the environment as we take more and more precious metals to make electronic products, but recycle so little. A typical computer contains copper, iron, gold and nickel which can be recycled along with glass. Some companies in Australia specialise in the treatment of e-waste and claim that they can recycle up to 98 per cent of a typical computer. However, 98.5 per cent of computers are not recycled at all as people don't want to pay to safely dispose of the equipment they have stopped using. Even with the best intentions, Australians cannot recycle all of the e-waste onshore. There is no facility that can cope with removing precious metals from circuit boards for example, and for this to take place they must be shipped overseas to countries such as South Korea or China.

E-waste contains dangerous products which, if dumped in a landfill, can leach into the soil and become chemical contaminants. Dangerous materials include lead, mercury, beryllium, barium and cadmium. There are also dangerous chemicals used to reduce the risk of fire in circuit boards. Brominated flame retardants are highly carcinogenic (cancer causing) and have the ability to 'bioaccumulate'. This means that they stay within a human and build up over time. A typical desktop computer has about 1.7 kg of flame retardants. There are health problems associated with exposure to these chemicals, and if they are not properly disposed of there is a risk that they find their way into our soil, our water and eventually into us.

From local councils to federal government authorities, Australians are trying to cope with the increasing amount of e-waste. South Australia is the first state to totally ban televisions and computers from landfills. From September 2012 all e-waste was banned from landfill sites in Adelaide. From September 2013 all e-waste will be banned in regional South Australia.

The National Television and Computer Recycling Scheme allows households and small business to drop off televisions and computers for free. This is a very popular scheme, but in the whole of Adelaide there are only four centres where this can occur. It is a shamefully common site to see dumped television sets in the foothills of Adelaide. Charity shops also report large numbers of older electronic equipment (such as televisions) being dumped outside their premises. Moving the problem does not solve it.

Guiyu in China has become infamous as the e-waste dump of the world, where most of the recycling is done in small workshops using techniques that are banned in Australia. With too little concern for the safety of the workers or the environment, the burning of toxic plastics on hotplates or on open fires is common. Safety equipment is almost unknown. The air, soil and water of Guiyu are contaminated. Waste dumps leach dangerous chemicals and acids into the soil.

Best practice e-waste management calls for recycling of materials and increased concern for environmental and human health issues. To date too little has been done to address this significant problem. For a very good idea of how fast the problem is growing worldwide have a look at [Worldometers](http://www.worldometers.info/) <<http://www.worldometers.info/>> and check out the sales of electronic equipment.

Student activities

1. How much e-waste will you generate?

The **E-waste survey** (pdf, 228 KB) in Illustration 4: E-Waste on the GeogSpace website provides a list of electronic items. You can use this list, or write out your own list, and then do the following activities:

- fill in the number of electronic items you have personally, and what you aim to replace within 12 months
- fill in the number of common electronic items you have at home, and what you think will be replaced within 12 months
- contribute your answers to those of the rest of the class (you could do this by individual categories or by total number).

2. Are there solutions?

There are a number of statements listed below which provide possible solutions to the e-waste issue. Identify the pros and cons of each solution for you as an individual and as a member of a community.

- Build the expense of safe disposal or recycling into the cost of the equipment.
- Governments simply collect all e-waste and charge their populations through tax for disposal.
- Ship older models of electronic equipment (such as phones and computers) to poorer nations.
- Outlaw all hazardous substances from electronic equipment.
- Establish national and international dumping sites.