Lesson Background

This lesson plan has been designed using the Australia Curriculum to engage students from Middle and Upper Primary (Years 3 to 6), with extension activities for Lower High School (Years 7 and 8). This lesson plan can be adapted by teachers to meet individual teaching needs.

Lesson Aims

Students will discover the scale of mobile phone use in Australia, what happens to them when they are replaced, the environmental impacts of mobile phones in landfill and how to recycle them.
# Recycling Old Mobile Phones

## Learning Outcomes

As outlined in The Australian Curriculum:

<table>
<thead>
<tr>
<th>Year</th>
<th>Strand</th>
<th>Sub-Strand and Elaborations</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Science as a Human Endeavour</td>
<td>• Use and influence of sciences – pollutants (ACSHE051)</td>
</tr>
<tr>
<td>3</td>
<td>Science Inquiry Skills</td>
<td>• Processing and analysing data and information – tables and column graphs (ACSIS057)</td>
</tr>
<tr>
<td>3 &amp; 4 {'Cross-Year’ linkage}</td>
<td>Science as a Human Endeavour</td>
<td>• Questioning and predicting Yr 3 - (ACSIS053) or Yr 4 - (ACSIS064)</td>
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<tr>
<td></td>
<td>Science Inquiry Skills</td>
<td>• Planning and Conducting – surveys Yr 3 - (ACSIS054) or Yr 4 - (ACSIS065)</td>
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<td></td>
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<td>• Communicating - diagrams and reports (ACSIS060) or Yr 4 - (ACSIS071)</td>
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<tr>
<td>4</td>
<td>Science as a Human Endeavour</td>
<td>• Use and influence of sciences – waste management (ACSHE062)</td>
</tr>
<tr>
<td>5</td>
<td>Science Inquiry Skills</td>
<td>• Questioning and predicting – group discussion (ACSIS231)</td>
</tr>
<tr>
<td>5 &amp; 6 {'Cross-Year’ linkage}</td>
<td>Science as a Human Endeavour</td>
<td>• Planning and conducting – Internet research Yr 5 - (ACSIS086) or Yr 6 - (ACSIS103)</td>
</tr>
<tr>
<td>6</td>
<td>Science Inquiry Skills</td>
<td>• Nature and development of science – earth’s resources (ACSHE098)</td>
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<tr>
<td></td>
<td>Science as a Human Endeavour</td>
<td>• Questioning and predicting – group discussion (ACSIS232)</td>
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<tr>
<td>7</td>
<td>Science Inquiry Skills</td>
<td>• Use and influence of sciences – sorting waste (ACSHE121)</td>
</tr>
<tr>
<td>7 &amp; 8 {'Cross-Year’ linkage}</td>
<td>Science as a Human Endeavour</td>
<td>• Questioning and predicting – work collaboratively Yr 7 - (ACSIS124) or Yr 8 - (ACSIS139)</td>
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<tr>
<td></td>
<td>Science Inquiry Skills</td>
<td>• Planning and conducting – internet research Yr 7 - (ACSIS125) or Yr 8 - (ACSIS140)</td>
</tr>
<tr>
<td>8</td>
<td>Science as a Human Endeavour</td>
<td>• Use and influence of sciences – household waste (ACSHE135)</td>
</tr>
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</table>

### English

<table>
<thead>
<tr>
<th>Year</th>
<th>Strand</th>
<th>Sub-Strand and Elaborations</th>
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</thead>
<tbody>
<tr>
<td>5 to 8</td>
<td>Interacting with others</td>
<td>• Group discussion and presentations</td>
</tr>
</tbody>
</table>
Did You Know?
There are an estimated 21 million mobile phones in Australia – or one for every person in this country over the age of about five or six.

Did You Know?
With the average person replacing their mobile phones every 12-24 months, there are millions of old mobile phones that are either left unused or are discarded to landfill.

Did You Know?
About 70% of people in Australia have at least one old mobile phone at home. 32% have at least two or more.

Did You Know?
There are an estimated 21 million mobile phones in Australia – or one for every person in this country over the age of about five or six.

Background Information
How Many Mobile Phones are there in Australia?
Mobile Phones have fast become one of life’s most important communication tools. With new technological advances encouraging regular upgrades, mobile phones are rapidly becoming a major waste problem. In particular, they contain toxic materials which can harm the environment.

The following facts are referenced to Clean Up’s Mobile Phone Recycling Fact Sheet. (www.cleanup.org.au)

Classroom Activities

Classroom Activity 1:
How many mobile phones are in your home?

Worksheet 1:
How many mobile phones are in your home? (Appendix 1)

Aim: To demonstrate to students how many mobile phones (both used and unused) can be found in classmates’ homes and associated adult workplaces.

Timing: This activity should only take 20 minutes, however requires students to have gone home and identified the number of mobile phones in their homes the night before.

Ask students to, with the help of their family, track down all the used and unused mobile phones at their home, and write down the totals in the correct columns on Worksheet 1.

Students can also ask their family to see how many mobile phones are kept at their workplaces.

Finally, undertake a classroom tally to see just how many used and unused mobile phones were found in the homes and workplaces.

Curriculum Links:
ACIS057; ACIS054/ACIS065

Learning Stage:
Mid to Upper Primary.
Recycling Old Mobile Phones

Phones to Landfill
The following facts are referenced to Clean Up’s Mobile Phone Recycling Fact Sheet (www.cleanup.org.au)

Mobile phones are a part of e-waste and together with computers, printers and fax machines, contribute some 15% of total e-waste. When mobile phones are thrown out, they invariably end up as land fill.

Electronic waste is one of the fastest growing contributors to our waste stream. As more and more outdated electronic equipment ends up in landfill, the negative impacts of e-waste on the environment and humans will increase.

Did You Know?
Mobile phones contain substances which can be toxic as they break down. These substances include metals such as cadmium, mercury and lead.

These substances can harm the environment and human health if not handled properly. They can leach from decomposing waste in landfills, seep into the groundwater, contaminate the soil and enter the food chain. These toxins can cause health problems if people are exposed to them. By collecting mobile phones for recycling you can make sure these substances are kept out of the environment and don’t harm water, soil, wildlife or humans.

Components of Mobile Phones
The different components of your mobile phone that you may recognise include the circuit board, display screen, battery, charger, plastic casing, antenna, speaker, microphone and key pad.

To make a mobile phone, a range of different materials are used such as metals, plastic, glass, and not forgetting the paper and cardboard packaging. The life of the mobile phone starts with the extraction of raw materials from Earth to make each of the components in the phone.

For example, the copper wire in the phone starts as copper ore mined from the ground. Next, the raw materials must be processed to make them into a form that can be used. The copper ore must be smelted and refined into copper.

Next the processed materials must be manufactured into parts. Those parts must be made into components and those components eventually made into the entire assembled mobile phone. Next the finished mobile phone is packaged and transported from the factory to the retailer. At each step, energy and water is used and carbon dioxide is released (www.arp.net.au).

90% of the materials within a mobile phone can be recycled. All that material will help to reduce the impact we have on the environment when producing things out of virgin material.

Components such as batteries and circuit boards can be recycled in Australia at special licensed facilities. However some battery types cannot be recycled and are shipped and processed overseas under special permit called the Basel Convention (http://basel.int/).

Visit http://www.cleanup.org.au for fact sheets on mobile phones and the processes employed in their recycling.

Illustration of the life cycle of mobile phones, starting with the use of raw materials and ending with either the reuse, recovery of materials or landfill. Source: http://www.epa.gov/wastes/partnerships/plugin/cellphone/
Recycling Old Mobile Phones

Recycle Your Old Mobile Phone
Recycling saves a lot of energy and raw materials that are needed to produce new products.

Before you do anything with your old phone, please erase all of your personal data from the phone. If your old phone has a SIM card, swapping the SIM card from the old phone into a new one brings much of your personal data, such as your directory, etc. If you aren’t switching to a new phone, remove and destroy the SIM card. Don’t forget to remove or delete photos or videos before donating your phone.

Classroom Activity 2:
What’s in your mobile phone, and why it should be recycled!
Aim: To educate students about the different components that make up their phone and how each component can be recycled in some way.
Timing: 30 to 40 minutes.

Brainstorm and encourage open discussion with your class about what the main components of a mobile phone are. Think about where the raw materials come from that are required to make the phone. Students can read both the Clean Up Mobile Phone and ARP mobile phone fact sheet to learn about mobile phone recycling (www.cleanup.org.au and www.arp.net.au).

Batteries: can be made into new batteries by taking out the minerals.

Handset casing: recycled into mixed plastic and used to make plastic fence posts, pallets, Council park benches and some picnic tables.

Circuit boards: gold and silver can be taken from these and used to make nice jewellery.

Accessories: contain plastics and metals, can be shredded, sorted and then used to make new plastic or metal products.

Now, ask students to either break-off into groups, or as a class, brainstorm and encourage open discussion as to why mobile phones should be recycled.

The following summary points can be used as prompts. What are the benefits of recycling old mobile phones?

• Reduced need to use new resources such as minerals, metals, fossil fuels (oil is used to make plastics), wildlife habitat, water and virgin forests
• Prevent toxic substances including metals, such as cadmium, lead and mercury, and plastics from ending up in landfill and polluting our environment
• These contaminants can pollute ground water, the soil and even enter the food chain
• Old mobile phones can be pulled apart and their parts reused or recycled to make other things

This information is referenced to ARP (www.arp.net.au) and Clean Up Australia (www.cleanup.org.au).

Curriculum Links:
ACSHE051; ACSIS053/ACSIS064; ACSHE062; ACSIS231; ACSHE098; ACSIS232; ACSHE121

Learning Stage:
Mid to Upper Primary and Lower High School.
Classroom Activity 3:
Old Mobile Phone Recycling Program

Worksheet 2:
Mobile Phone Recycling Program
(Appendix 2)

Aim: To engage students to recycle as many old mobile phones as possible, and to educate them on the environmental benefits of doing so.

Additionally, this program also aims to promote student leadership as students are being tasked with running the program. Specifically, this aim links with the English Curriculum content area of ‘Interacting with others’ as students are tasked with preparing effective presentations and promotional materials to encourage staff, students, family, and friends to participate in the program.

Reference is made to Clean Up’s ‘Promotion Strategy for Students’. This has been designed by Clean Up for use by students in engaging and promoting the program to others, and is available for use once you are registered with Clean Up to take part.

Timing: For the most effective results, this program could be run over one term. This will allow plenty of time for old phones to be collected.

A good place to start the Schools Mobile Phone Recycling Program is to get students to think about what they are doing, how and why. Students are to complete Worksheet 2 - Your plan on setting up a mobile phone recycling program.

The worksheet covers the following areas, and teacher notes are provided below.

1. **Program Goal**: Goal (objective or aim) setting is important as it helps define the scope of the project. It also assists in setting out actions that will help to achieve the goals.

2. **Ideas to set it up**: is it feasible, are there resources available?

3. **Tasks needed to be completed**: action list, setting out all the actions or tasks that are needed to be undertaken in order to achieve goals.

4. **Teams**: break down the task list into responsibilities and assign these to individual members of the team, or groups of people.

5. **Who will be on the teams**: work out how many people you will need to compete the actions and how many people are interested in participating. This will form the basis of your team/s members.

6. **Promotion**: this is key to the success of the Mobile Phone Recycling Project. Without promotion, how will the message get to your target audience? You can use the Clean Up Schools Mobile Phone Recycling Project Promotions Strategy to ensure your project receives the attention it deserves!

7. **Measure of success**: It is important to think about how you will measure the success of your project. It may be the number of phones collected (and therefore recycled) or it may be the number of students/teachers engaged in the project.

*Activity 3 continued over*
Recycling Old Mobile Phones

Recycling Program – Step by Step Guide

Register: Register your school with Clean Up Australia (if you haven’t already done so) who, through a partnership with the Aussie Recycling Program (ARP), will then post out your recycling box along with an educational kit.

Teams: Form a group of supporters, consisting of a couple of teachers to provide support, but primarily a core group of enthusiastic students. The students should be encouraged to lead the program. Students will be involved with phone collection, communications to the wider school community to educate them about mobile phone recycling and creative promotion.

Resources: Clean Up will give your school a Schools Mobile Phone Recycling box, Schools Mobile Phone Curriculum Linked lesson plan, fact sheets, ‘How to organise a mobile phone collection’ guidelines, Promotion Strategy designed for use by students and promotional posters.

Promotion ideas
• Engage students with the Clean Up Australia Promotion Strategy.
• Run an art competition for students to design and create the most appealing promotion posters for both the recycle box (which you can customise) and other in-school advertising opportunities.

Return of Mobile Phones
Once you have filled the box with phones, or collected as many phones as possible, simply pack the phones into the bag provided, seal it and let ARP know it’s ready to be returned to them, free of charge.

Clean Up Australia will provide recognition of your effort.

Curriculum Links: ACSIS054/ACSIS065; ACSIS060/ACSIS071; ACSIS086/ACSIS103; ACSIS124/ACSIS139; ACSIS125/ACSIS140; ACSHE135

English: Interacting with others – group discussions and presentations

Learning Stage: Upper Primary and Lower High School.

Extension Activity
Promotion of Mobile Phone Recycling Program to family and friends - through satchels and family and friends’ workplaces.


Learning Stage: Lower High School.

Sources & Further Information

Clean Up Australia Website
www.cleanup.org.au/au/CleanUpMobilePhone/

Recycling Mobile Phone Fact Sheets

United States Environmental Protection Agency
‘Wastes - Partnerships – Plug into Ecycling’
last updated 27 October 2010.
www.epa.gov/wastes/partnerships/plugin/cellphone/

Aussie Recycling Program (ARP)
Australia’s first Mobile Phone Recycling program that provides a solution to help clean up the environment while at the same time helping raise much needed funds for charities.
www.arp.net.au

The Basel Convention
Information on the control of transboundary movements of hazardous wastes and their disposal. Apart of the United Nationals Environment Program.
http://basel.int/
Appendix 1.
Worksheet 1: How many mobile phones are in your home?

Instructions:
(a) Track down all the used and unused mobile phones at home, then write down the totals in the chart below. Don’t forget to ask your family how many mobile phones are kept at their workplaces.

(b) Bring your completed sheet to class with you so you can contribute to the classroom tally.

<table>
<thead>
<tr>
<th>How many mobile phones have you found?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Used</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Home</td>
</tr>
<tr>
<td>Work</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
Appendix 2.
Worksheet 2: Your plan on setting up a mobile phone recycling program

1. What is the goal of the program?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

2. What ideas do we have to set up the program?

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3. What tasks need to be completed?

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________________________________________________________________________
________________________________________________________________________

4. What teams should we set up to complete each task?

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________________________________________________________________________
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5. Who will be in each team?

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________________________________________________________________________
________________________________________________________________________

6. How will we tell other students about the program?

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________________________________________________________________________
________________________________________________________________________

7. How will we measure the success of the program?

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________________________________________________________________________
________________________________________________________________________