

E-Waste lesson plan

This flexible suite of activity and lesson ideas helps pupils learn about the growing problem of e-waste and how they can play their part in reducing the amount of electronic waste we create.

Age range: 11-14

Time: 1 hour

Introduction

E-waste is unwanted electronic goods that are sent to landfill. As we buy more electronic goods and replace them more often, e-waste is becoming one of the biggest waste challenges for the future – possibly the biggest.

E-waste contains many valuable parts and materials, including metals, plastics and glass, that can be recovered and re-used or recycled as well as working items like out of date phones that can be re-used by someone else.

Instead of sending electronic equipment like mobile phones, TVs or computers to landfill, it's far better to recover these parts and materials. Landfill sites take up space and can be unsightly and if not managed carefully, toxins in e-waste can pollute the local environment and community.

Subjects

This activity can cover a wide range of curriculum areas, including:

- ▶ **England:** Science, Geography, English, Citizenship/PSHE, Literacy and Numeracy
- ▶ **Scotland:** Geography, English, Health and Wellbeing, Literacy and Numeracy
- ▶ **Wales:** Geography, English, Personal and Social Education, Literacy and Numeracy
- ▶ **Northern Ireland:** The World Around Us, English, Personal Development, Literacy and Numeracy.

For formal curriculum links see page 23.

Learning objectives

- ▶ To understand the meaning of e-waste
- ▶ To know how e-waste can pollute the environment and cause a problem
- ▶ To know that unwanted electronic goods can instead be re-used or recycled
- ▶ To be motivated to take practical steps to re-use or recycle unwanted electronic goods and play a personal part in preventing e-waste
- ▶ To encourage friends and family to do the same.

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Overview of activities

| Activity / lesson | Description |
|--|---|
| Concept maps: What electronic items do we own? | Pupils generate ideas for the many kinds of electronic and electrical items they own themselves or which their family owns. |
| Peer or home survey | Pupils survey their peers or family and quantify what items they all have, and optionally how they feel about recycling. |
| Reading exercise and creative responses: Why re-use or recycle? | Pupils read one of two differentiated passages to discover why it's important to reuse or recycle electrical and electronic waste, answering a short series of questions. Teachers can follow up with one of a selection of creative responses. |
| Discussion and role-play: Perspective cards | Pupils read short cards that outline a person's perspective and can discuss what's interesting or important about what they say. Teachers can guide a discussion, debate and other follow-up activities. |
| Life cycles | Pupils sort cards to discover what materials go into a mobile phone and what these can be made into when recycled, to highlight the benefits of re-using or recycling. |
| History from the future | Pupils imagine what things might be like if we don't reuse and recycle WEEE goods, or if we do, and bring their ideas to life through discussion questions, brief role-plays or creative writing. |

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Useful links

Use these web links to find out more about e-waste and how to recycle electronic goods.

Pupils can use the web links to help their optional research after the reading activity.

Wikipedia – electronic waste
https://en.wikipedia.org/wiki/Electronic_waste

Don't bin it – bring it
<http://www.dontbititbringit.org/>

WRAP sustainable electricals
http://wrap.org/sustainable_electricals

India's growing e-waste headache (BBC article)
<http://www.bbc.co.uk/news/business-33813128>

e-waste's 'toxic mine' (Independent article)
<http://www.independent.co.uk/news/world/politics/electronic-waste-worth-34bn-piling-up-in-toxic-mine-warns-un-report-10187364.html>

European Recycling Platform e-waste
<http://www.erp-ewaste.co.uk/>

Find local information by searching for 'electronic recycling' and the name of your unitary authority.

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Concept maps: What electronic items do we own?

Lesson outcomes

To understand the range of electronic items a family, school or business might own.

Timing

20 minutes

Preparation

You may wish to print copies of the 7-11s template for What electronic items do we own? (in the Waste Week lesson plan for 7-11s, available on <http://jointhepod.org> to help less able pupils.

This provides a model concept map they can occupy and expand with their own ideas.

Delivery

Ask pupils to describe what the phrase 'electronic goods' means.

Ask pupils to suggest some examples. Divide pupils into pairs or groups. Give pupils time to discuss and generate ideas for the devices their family members each have and use, or which they share as a family.

Guide pupils to complete a concept map for their area of life, with the area of life at the centre, tasks or activities around this, and electronic devices linked to each activity. (You may wish to model how to develop a concept map with 'family' at the centre, family members' names leading from this, and different devices linked to each person with a line.)

Invite pupils to hold up their concept maps and talk about them. Find out which items appear most frequently (like mobile phones and TVs) and which ones pupils feel are most important in life. (This can generate an interesting discussion around the definition of 'important'!)

Help pupils identify that electronics permeates all aspects of life, from mobiles to computer-aided home appliances, transport, medicine and learning. Link this to the potential for waste: with so many electronics around us, and with it being upgraded and replaced so often, what's the potential for waste, if we don't think of better ways to deal with it?

Explain that old or unwanted electronic items, if put in the bin so they get sent to landfill, become 'e-waste'. This is a worry, because they can pollute, and doing so wastes valuable materials or parts that can be used again if, instead, these items are re-used or recycled. Explain that pupils are going to find out more about e-waste and what they can do with it, in other activities.

Make easier

Less able pupils can use the 7-11s template to think about how their family uses electronic goods.

Create a class example by drawing a simple concept map on the board showing your own family's electronic goods, for pupils to model. List common items on your board or project a montage of photos.

Make harder

Challenge pupils to complete their concept map unaided and make it as comprehensive as possible.

More able pupils can think about an area of life according to ability: home, school, office, shopping, leisure, health and medicine, manufacturing, and so on.

Assessment for learning

- ▶ Understanding of the meaning of 'electronic goods' and 'e-waste'
- ▶ Written work
- ▶ Questioning and discussion

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Peer or home survey

Lesson outcomes

- ▶ To be able to state the numbers of electronic items owned by pupils' families.
- ▶ To present data in a bar chart or as tallies.

Timing

30 minutes of lesson time to develop surveys.
Home learning time to complete surveys.
One lesson to review and present data.

Preparation

Less able pupils could choose questions from the 7-11 survey template for Peer or home survey (In the Waste Week lesson plan for 7-11s, available on <http://jointhepod.org>) or use the example questions below to develop a suitable template for these pupils.

Pupils will need graph paper to present their data. You may wish to create a bar chart template for some pupils to use.

Delivery

Briefing and survey development

Use questioning to help pupils identify that a good way to understand the size of the e-waste challenge is to find out exactly how many electronic goods we all have – and therefore might replace one day.

Example cline questions:

| | A little | | | | A lot |
|---|----------|---|---|---|-------|
| I know what 'e-waste' means | 1 | 2 | 3 | 4 | 5 |
| It's important to recycle or re-use e-waste | 1 | 2 | 3 | 4 | 5 |
| I know how to recycle or re-use e-waste | 1 | 2 | 3 | 4 | 5 |

Brief pupils on when to complete their surveys and bring them in.

Invite pupils to suggest how they might survey their peers or families. What questions might they ask, and how could they record their data?

Help pupils identify that their surveys could include ways to:

- List or count how many electronic goods they own (e.g. by each person ticking or circling items on a list)
- Explore their attitudes and understanding (e.g. through yes/no questions or 'cline scale' questions where each person circles a number to show how strongly they agree or disagree with a statement)

Give pupils time to draft some survey questions. Share suggestions, example questions and question formats. You may wish to ensure pupils include some common questions that allow you to combine data during the following analysis lesson, for example to find out how many common items each family owns.

Make easier

Less able pupils can use the 7-11s template to think about how their family uses electronic goods.

Create a class example by drawing a simple concept map on the board showing your own family's electronic goods, for pupils to model. List common items on your board or project a montage of photos.

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Analysis

As a quick starter, ask pupils to discuss in table groups why a survey of electronic items could play a part in reducing the number of those that might become e-waste or not re-used or recycled (it can help direct information and people who most need it and give them targeted information). Share ideas.

Use questioning to help pupils identify some suitable ways to arrange and present their survey data, for example as a series of tally marks, pie or bar charts.

(Ensure pupils are clear on when to use pie or bar charts.)

Discuss how to convert the tally marks for each type of question into a pie or bar chart. What will be the value of the tallest bar? What will make a suitable scale range for the bar chart? How can pupils convert responses into the angles for a pie chart?

Help pupils draw appropriate charts to show how many electronic items of each kind the class's families own and to present responses to their other questions.

As a plenary, discuss what the charts can tell pupils:

- ▶ What are the most common popular items?
- ▶ Which of these items might get replaced most often?
- ▶ What are pupils' families attitudes like towards recycling e-waste?
- ▶ Which items do pupils think their families need most encouragement to re-use or recycle?

Make easier

Use the 7-11 survey template, especially Q1. Pupils can create bar charts of their own family or the families of pupils on their table, rather than create a whole class tally first. Create a template for pupils to tally up their results, and to draw a bar chart.

Make harder

Pupils design their own survey and can include questions suitable for representation using pie charts. Pupils could analyse their results to see if attitudes towards recycling vary between family members (e.g. are girls better at recycling than boys? Are children more concerned than adults? Do adults know more about recycling than children?).

Assessment for learning

- ▶ Discussion and questioning
- ▶ Completed surveys
- ▶ Pupil's tally marks and bar charts

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Reading exercise and creative responses: Why re-use or recycle?

Lesson outcomes

- ▶ To identify information about e-waste and the importance of recycling electronic goods
- ▶ To use an internet search to find out more and e-waste (optional)
- ▶ To develop a personal response to the challenge of e-waste in a creative activity

Timing

One lesson plus time for an optional creative response.

Preparation

Print one pupil sheet (reading exercise on pages 17 and 18) per pupil – choose whether each pupil will read version A or version B.

Choose and plan a creative follow-up activity using the ideas below to kickstart your thinking.

You may need to book internet access for optional internet research about e-waste.

Choose whether pupils will report back verbally or complete a written report as a home learning activity.

Delivery

Ask pupils why it can be important to read for information. Use questioning to help pupils identify that reading for information can give us facts that help us do the right thing and take action about important issues. Waste, and e-waste in particular, is one of these things.

Ask if pupils know the meaning of 'e-waste' and use a show of hands to gauge understanding (don't explain – pupils will read this).

Ask pupils to read the paragraphs on the pupil sheet. Explain that they will need to answer some questions about what they have learned (you may need to tailor the questions to suit your pupils' ability).

Either ask pupils to share what they found surprising, unusual or interesting. How does the potential

impact of e-waste make them feel? What's their response?

Pupils can use the search terms to find out more about e-waste and recycling in your local area. This can be a lesson activity or home learning. Pupils can present back their information verbally or complete a written report as a home learning activity.

Explain that pupils have the choice to take action or not – what reasons have they discovered that will motivate them?

Use shows of hands to identify how much of the class now thinks e-waste is an issue we need to address, and how many are prepared to take action and not let their own unwanted electronics become e-waste.

Make easier

Less able readers can read version A.

Discuss the questions first as a class before asking pupils to write their answers.

Set appropriate challenge during the creative response.

Use the search terms to identify a selection of web pages for pupils to visit and read during their research.

Make harder

Ask pupils to read version B and write their response to the questions in more detail.

Set appropriate challenge during the creative response.

Set appropriate expectations for any verbal or written report on what pupils research.

Assessment for learning

- ▶ Observations of reading
- ▶ Verbal or written comprehension
- ▶ Discussion and questioning
- ▶ Shows of hands
- ▶ Creative responses

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Creative response ideas

As a follow up activity, pupils could:

- ▶ Create a magazine piece for a news programme by interviewing one another, peers or family about e-waste and recycling, to probe their understanding and attitudes and highlight the importance of taking action to re-use or recycle.
- ▶ Write a letter or email to a friend, family member or local paper about the importance of recycling e-waste, or a brief article for a newspaper or magazine.
- ▶ Create a poem or song to encourage others to re-use and recycle unwanted electronic goods.
- ▶ Create an information video or advert to encourage recycling.
- ▶ Create an assembly about e-waste and how to make the right choices.
- ▶ Design a poster to encourage people to re-use or recycle unwanted electronic goods.
- ▶ Find out how to sell, re-use or recycle electronic goods locally, for example finding donation boxes or charity shops that will accept them.

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Discussion and role-play: Perspective cards

Lesson outcomes

- ▶ To identify and understand different views about e-waste and recycling
- ▶ To explain some risks and problems when e-waste is sent to landfill and identify steps to prevent e-waste.

Timing

1 hour

Preparation

Print and cut out copies of the pupil sheet (perspective cards on pages 19 and 20) to share within groups of up to six pupils.

Delivery

Ask pupils to form groups of six. Hand out perspective cards. Ask pupils to read their cards out to their group, beginning by introducing themselves and saying their name.

Once all groups have shared their six perspectives, ask pupils to discuss in their groups:

- ▶ Which person is most like you?
- ▶ What's more important about what each person has to say?

Use a show of hands to identify how many pupils agree with John's perspective, and how many feel more like Aimee.

Ask pupils to suggest how each perspective can contribute to pupils' understanding of the issue and what to do about it. What can pupils learn from each person, including Aimee?

Use these questions to help your discussions:

John

- ▶ How can John's example help us convince others to take action?

Aimee

- ▶ What barriers are stopping Aimee from taking action? How could she be persuaded to change her mind? (How to overcome these barriers.)

- ▶ What might John, Jamal or Chen want to say to Aimee? (If time permits, selected pupils could role-play a face-to-face conversation between them, for the class to observe and discuss.)
- ▶ What if Aimee knew as much as you do?

Jamal

- ▶ What can Jamal's life today warn us about life for many people in the future, if we do not take action to reduce e-waste?

Pruthvi

- ▶ How would you help Pruthvi find information and take action?
- ▶ How could you copy Pruthvi's example?

Ryan

- ▶ How could Ryan encourage his family?
- ▶ How could you copy Ryan's example and encourage your own family?

Chen

- ▶ What can people in developed countries do to help Chen?

(It's worth pointing out that many countries including the UK have signed an agreement not to export e-waste to other countries, but this can still happen elsewhere or if waste is not managed properly.)

Use questioning to help pupils identify that they all have their own part to play in avoiding e-waste: how many mobile phones and other items might they buy and want to replace in their lifetimes?

Make easier

Work as a class. Use stimulus questions to help pupils explore each point of view. Take on the role of Aimee and invite pupils to talk to you in character as John, Jamal or Chen, for the class to observe.

Make harder

Ask pupils to work in groups of six and report back their ideas at each stage. Pupils might write a short letter or email from Jamal to Chen to someone in the UK, encouraging them to re-use or recycle e-waste and not let it become a landfill problem.

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Assessment for learning

- ▶ Observations of group work
- ▶ Discussion and questioning
- ▶ Optional written or role-played follow-up

Extension ideas

Pupils could incorporate the characters into a presentation or assembly. For example they could role-play a debate between John and Aimee. Pupils could hold a brief 'international conference', with John, Aimee, Jamal and Chen in attendance. What might each person want to say?

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Life cycles

Lesson outcomes

- ▶ To understand the many ways in which e-waste can be re-used or recycled
- ▶ To list some ways that a whole item, its parts or materials could be used

Timing

15-30 minutes

Preparation

Print copies of the pupil sheet (life cycle cards on page 21), enough to share as pairs or small groups, and cut them into individual cards. For each group, keep the three stage 1 cards separate from the stage 2 and 3 cards, which can be mixed.

Delivery

As a short starter, ask pupils to get into pairs or small groups. Ask pupils to think of all the things a mobile phone might get turned into if it is recycled. Share ideas.

Explain that pupils are going to explore their ideas in a little more detail. Hand out one set of life cycle cards to each group, keeping each group's stage 1 cards separate from its stage 2 and 3 cards.

Explain that the cards follow three stages; three cards give options for the state of the phone when it's given for recycling. It might be a complete, working phone, have some working parts, or only be suitable for breaking up to recover the different materials in it. Ask pupils to suggest some scenarios when a mobile might get recycled in each state (e.g. it's fine but the owner has upgraded, the screen is smashed but the phone is OK, and the phone has been run over by a car and is non-working).

The remaining cards list what the phone's parts or materials might be, and what they might become when the phone is recycled. These cards are all mixed up!

(You may wish to model one example before pupils use the cards themselves. Select a stage 2 card and ask pupils to select some appropriate stage 3 cards to show what this part or material might be used for in the future.)

Ask groups to work through the stages one at a time. Invite pairs or groups to feed back at each stage.

- ▶ Start by selecting one of the stage 1 cards, e.g. 'A working phone'.
- ▶ Ask pupils to sort their cards and identify which cards list which bits will get recycled (in this case, just 'the whole phone').
- ▶ Now ask pupils to sort which cards list how the cards will be used (in this case 'sold to a new owner').

Help pupils identify that at stage 3, some materials may be made into more than one new thing. Plastics might be made into new phone parts or traffic cones, while gold and silver might be made into jewellery or new phone parts, for example. Cadmium would only be made into new parts as it's not safe to use as jewellery.

Once you have shared ideas, help pupils identify that recycling a phone can include ALL of these stages:

- ▶ A working phone could be re-used several times until it stops working or is too old for software updates
- ▶ A phone may have some working parts, with the rest separated to recover the materials.
- ▶ These working parts could end up in a new phone that itself gets re-used, then recycled as parts and finally materials.

Invite pupils to share examples of where they already re-use or recycle phones, for example, where a parent or older sibling gives a phone to a child or younger sibling when they upgrade.

Help pupils identify that re-use is the best option. Can pupils spot that a phone could be re-used a few times in the UK, and then perhaps donated to be sold abroad where it might be re-used again by new owners, until it's ready to be recycled?

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Make easier

Keep the stage 2 and 3 cards separate. Cut out the stage descriptions from the pupil sheet, for pupils to use to help keep their cards organized on the table.

Make harder

Mix the stage 2 and 3 cards.

Ask more able pupils to work backwards, starting with a stage 3 card (e.g. 'jewellery') and work back to identify the relevant stage 2 cards (e.g. 'gold' or 'silver') and stage 1 card (e.g. 'a completely broken phone').

Assessment for learning

- ▶ Observation of pupils' sorting
- ▶ Questioning and discussion
- ▶ Optional follow up written work or displays

Optional follow up ideas

Pupils could write a short article explaining the many ways in which a mobile phone can be re-used or recycled, including as a working phone, as a series of working parts, or as recovered materials.

Pupils could create a wall display to show their ideas, drawing or painting whole phones, parts and materials and showing how their life cycles can be extended by reusing or recycling them, including how one phone can go through several leases of life as it is re-used, its parts are re-used, and then finally broken up so their raw materials can be recovered.

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History from the future

Lesson outcomes

- ▶ To imagine and describe the future impact of our choices about re-using and recycling electronic goods
- ▶ To make links back to our future choices and identify positive actions to take

Timing

20 minutes – one lesson, plus optional follow up time. The time required will depend on your choice of creative response during the main activity – see below.

Preparation

Choose your preferred delivery idea. There is no pupil sheet for this activity.

Delivery

As a quick starter, ask pupils to think of some examples of how what we do now can affect what we're able to do in the future, and share suggestions. (Examples include spending now v. saving, fitness and health, education etc.) Explain that one example is the importance of recycling rather than letting unwanted materials go to waste.

Ask pupils to list some things that can be recycled (e.g. paper, plastic, glass, metals etc.) and reasons why recycling is important. Use questioning to help pupils identify that recycling keeps materials out of land fill (buried waste) and allows them to be used again. Some materials, like plastics, are made from oil, a finite natural resource that will run out. Others, like some metals, are much more environmentally friendly to recycle than to replace by mining and processing more raw materials.

Ask pupils to form small groups. Explain that you want pupils to imagine life in the future – perhaps in 10, 20, 50 or 100 years' time. Divide groups into two: some groups are going to imagine a life where people now carefully recycled, so the materials we need to make electronics and other items are still available to be re-used. Others are going to imagine a future where people today did not bother to recycle. These materials are now unavailable to use and so electronics and plastics are either unavailable to use, or so expensive only the wealthiest can afford them.

Pupils can:

Discuss: Give pupils time to discuss what their lives might be like. What will be the same? Different? Harder? Less enjoyable? How might work, leisure, learning and healthcare have changed because of our actions today? Invite each group to share their ideas. For example, pupils could write one or two words on A4 sheets and hold them up for others to see. Gather ideas on your board to highlight differences between the two scenarios.

Role-play: Pupils could role-play some common situation in the future they are imagining. Ideas could include learning at school, hanging out with friends, trying to find important information, or being at work. Invite selected groups to share their role-plays with the class.

Write: Pupils could write a brief 'day in the life' description, a poem or other creative response, capturing the facts of life and their resultant feelings and emotions.

Record video: Pupils could create a 'vox pop' compilation of what it's like to live in this scenario. (Or without video, stand in line to share their thoughts with the class.)

Help pupils identify common ideas and the key differences between the two scenarios. These could include the issues caused by lack of access to information, being unable to enjoy entertainment, or the impact of pollution from toxins in e-waste.

Use a vote to identify which future pupils would want for their children – the people who will inherit the decisions we make and actions we take in the present day.

Pupils could follow up by writing or recording a message from the future to their present selves, friends and families. This could highlight the importance of recycling and give practical ideas on how to ensure unwanted electronic goods are re-used or recycled, instead of becoming e-waste.

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Make easier

Use delivery ideas appropriate for the group. Gather ideas on the board to help pupils see the differences between the two outcomes.

Make harder

Encourage pupils to think more widely about the impact of pollution or lack of availability of everyday electronic goods.

Assessment for learning

As appropriate for your preferred delivery:

- ▶ Observations of role-plays
- ▶ Questioning and discussion
- ▶ Recordings
- ▶ Written work

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Word Bank: Pupil sheet

You may wish to use these word bank card to help pupils develop their vocabulary:

Electronic

Waste

E-waste

Metal

Plastic

Recycle

Re-use

Landfill

Pollution

Natural
resource

Decompose

Obsolete

Consumer
demand

Toxin

Accumulate

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Glossary: Pupil sheet

| | |
|-------------------------|--|
| Accumulate | Build up over time |
| Consumer demand | The amount of a product that people want to buy |
| Decompose | Go rotten and break down |
| Electronic | An electrical item than includes computer chips, like a mobile phone, tablet, laptop or TV |
| E-waste | Old electronic items that are thrown away |
| Landfill | Waste that is buries in the ground |
| Metal | A solid, conducting material like copper, steel or gold |
| Natural resource | Materials found in nature that are used for energy or to make things |
| Plastic | An insulating material, made from oil, that can be molded into different shapes |
| Pollution | A harmful or poisonous substance in our environment |
| Recycle | Collect waste and turn it into new things |
| Re-use | Use an old item again |
| Toxin | A poisonous substance |

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Why re-use or recycle e-waste?

Pupil sheet

Version A

Electronic items are things like mobile phones, games consoles or TVs. If old models get thrown away, they become 'e-waste'. E-waste is a fast-growing waste problem.

These items are made out of plastics and metals. If they are thrown away they are sent to land fill sites where they are buried in the ground.

Plastics last a very long time and do not break down. They are made from oil, a natural resource which one day will run out. Sending plastics to land fill creates waste that won't go away. It wastes plastics that could be used again.

Some metals in e-waste are rare 'heavy' metals like cadmium or mercury. These metals are poisonous. They can harm plants, animals or people. This can harm the local environment and community. It wastes metals that could be used again.

E-waste does not have to end up as a problem. Instead, re-use or recycle it. Lots of people are happy to use an older phone, console or TV. You can sell older items or donate them to a charity.

E-waste can be recycled, just like metals and plastics in your family's recycling bin. The e-waste items are sorted and taken apart. The different plastics and metals are separated and cleaned. They can be used again to make new items.

Re-using and recycling e-waste keeps these items out of land fill. It finds new owners for older items, or lets their metals and plastics be used again.

Version B

Electronic goods quickly become obsolete as new and better models are released to meet consumer demand. There's even a name for this: 'planned obsolescence'. If old models get thrown away, they become 'e-waste'.

E-waste is a fast-growing waste problem as people replace electronic goods more and more frequently.

Electronic goods are made out of a range of plastics and metals. If they are thrown away and sent to landfill, e-waste can cause many problems.

Plastics last a very long time and do not break down. They are made from oil, a finite natural resource. Sending plastics to land fill creates waste that won't go away, and wastes materials that could be used again.

Some metals in e-waste are rare 'heavy' metals like cadmium or mercury. Unlike more common metals like steel, these are poisonous. They can harm plants, animals or people. Toxins like this can enter local water supplies and accumulate in the food chain: they are absorbed by plants which animals then eat, and these animals are then eaten by larger predators – including humans, who may also drink polluted water. Sending these metals to landfill creates waste that can harm the local environment and population, and wastes metals that could be used again.

E-waste does not have to end up as a problem. Instead, re-use or recycle it:

Not every consumer needs or wants the latest phone, console or TV. Online sites will buy older phones or you can list used electronics on auction or 'for sale' websites or social media groups. Donating to a charity is another option, by dropping off at a charity shop or using a donation box in a school or business. Charities raise money for good causes by selling these items to new owners, in the UK or abroad.

E-waste can be recycled, just like metals and plastics in your family's recycling bin. The e-waste items are sorted and taken apart. The different plastics and metals are separated and cleaned so they can be used again to make new items. This happens in a controlled environment where toxic metals can't harm the workers or the local environment.

Re-using and recycling e-waste keeps potentially harmful e-waste out of land fill. It finds new owners for older items, or lets their metals and plastics be safely recovered and used again. It prevents waste that

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won't decompose or go away, and it stops poisonous metals from harming the environment or people. And it might even earn you a few pounds!

Use these search terms to answer the questions on the next page:

- E-waste
- Electronic waste
- WEEE
- E-waste recycling and re-use
- Plastic waste
- Toxic metal waste

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Perspective cards: Pupil sheet

I always send my old phone to be re-used or recycled. I don't like things going to waste. It's important to look after our planet. That means using things again instead of wasting them or letting them cause pollution. E-waste contains plastics that don't break down and some of the metals they use are toxic to plants and animals, including humans. Creating e-waste just causes a problem that won't go away. But re-using or recycling gives old electronics a new lease of life.

John

I just throw my old phone away. Who wants an old phone? I don't really think about it. I'm more interested in my new phone! Recycling is boring. I don't think it's important. I don't know what happens to waste but as long as it doesn't pile up in our street it's not a problem for me. Don't they just bury it, anyway? That must be OK if it's hidden underground. It won't harm anybody, will it?

Aimee

My family lives near a landfill site in India. It's full of old TVs and computers. The waste pollutes our water and makes people sick. Someone said it's the chemicals inside them that are poisonous. My father is sick and can't work. I'm really worried about him. I've had to leave school to support our family. If I can't finish my education, I won't get a good job when I grow up. Some people scavenge from the landfill. I hope I never have to do that, or I might end up sick like my father.

Jamal

E-Waste lesson plan

I like to recycle things. It's the right thing to do. I want to recycle things like our old TV, or my old phone when I get a new one. I don't know how to do this. I want to know who to ask, or where I could find out.

I've heard there are websites for selling your old phone, and you can sell used TVs and things online as well, can't you? Or I could donate them to a charity shop instead.

And I think the council recycles electronic stuff if you take it to the tip, or some places have a box you can drop stuff into. What ideas have you got?

Pruthvi

My family throws out old electronic items. I want them to stop and recycle them instead. I'm not sure what to say to change their minds. I need some ideas to help them do the right thing!

Thing is, they just can't be bothered and don't think it's important. 'Out of sight, out of mind', that's what I think the problem is. So I need to help them understand that sending phones and things to waste causes pollution and creates a big pile of plastic and stuff that just won't go away. People will be stuck with it for centuries.

So what could I say to persuade them? I want them to see that it's the right thing to do.

Ryan

Lots of old computers get sent as waste. They end up in my town in China. There's literally a mountain of old computers and monitors. People take the computers apart. Scrap dealers will give them money for some of the parts - the ones that contain valuable metals. Then they sort the plastic bits and sell them, but for less money. It's not safe. The waste mountain is dangerous to climb on. People just rip the parts up and I've heard that the metals in them are poisonous. I wish people would recycle them properly, instead. That way they would go to a proper recycling place where they are taken apart safely and without polluting our town.

Chen

E-Waste lesson plan

Life cycle cards: Pupil sheet

Stage 1: What is recycled?

A working phone

A phone with some parts that work

A completely broken phone

Stage 2: Which bits get recycled?

The whole phone

Case

Screen glass

LCD screen

Battery

Lens

Microphone

Circuit board

Speakers

Case plastic

Glass

Steel

Copper

Gold and silver

Lead

Cadmium
(a poisonous metal)

Nickel

Stage 3: What happens to them?

Used to make refurbished or new phones

Sold to a new owner

Traffic cones

Jewellery

Made into phone parts

Bicycle frames

Drinks bottles

Piping

E-Waste lesson plan

Why re-use or recycle e-waste?

Pupil sheet

1. List some sources of e-waste:

2. Briefly explain how electronic goods become e-waste:

3. List some materials e-waste can contain:

4. Briefly explain why e-waste can cause harmful pollution:

5. Briefly explain how valuable parts and materials can be recovered from e-waste:

E-Waste lesson plan

Curriculum links

England

Science

Earth and atmosphere

Earth as a source of limited resources and the efficacy of recycling.

Geography

Human and physical geography

How human and physical processes interact to influence, and change landscapes, environments and the climate; and how human activity relies on effective functioning of natural systems.

PSHE

Rights and responsibilities, social and moral dilemmas, choices as consumers.

English/Literacy and Maths/Numeracy

Pupils will also be able to develop their literacy and numeracy skills, depending on the optional creative or extension ideas you choose to use. These include developing their speaking and listening skills in discussion and role-play, factual and creative writing to create plays, letters, poems and reports; and to handle data from surveys.

Wales

Science

Interdependence of organisms

How humans affect the global environment.

Sustainable Earth

Sustainable materials; sustainable industry.

Geography

People as consumers; sustainability and sustainable changes; being tomorrow's citizens; making a difference locally, nationally and globally.

Personal and Social Education

Sustainable development and global citizenship.

English/Literacy and Maths/Numeracy

Pupils will also be able to develop their literacy and numeracy skills, depending on the optional creative or extension ideas you choose to use. These include developing their speaking and listening skills in discussion and role-play, factual and creative writing to create plays, letters, poems and reports; and to handle data from surveys.

Scotland

Science

Topical science

Geography

I can identify the possible consequences of an environmental issue and make informed suggestions about ways to manage the impact.
SOC 3-08a

Health and wellbeing

As I explore the rights to which I and others are entitled, I am able to exercise these rights appropriately and accept the responsibilities that go with them. I show respect for the rights of others.
HWB 0-09a / HWB 1-09a / HWB 2-09a / HWB 3-09a / HWB 4-

Through contributing my views, time and talents, I play a part in bringing about positive change in my school and wider community.

HWB 0-13a / HWB 1-13a / HWB 2-13a / HWB 3-13a / HWB 4-13a

English/Literacy and Maths/Numeracy

Pupils will also be able to develop their literacy and numeracy skills, depending on the optional creative or extension ideas you choose to use. These include developing their speaking and listening skills in discussion and role-play, factual and creative writing to create plays, letters, poems and reports; and to handle data from surveys.

E-Waste lesson plan

Northern Ireland KS3

Science

Earth and Universe: the environment and human influences.

Pupils as contributors to society and to the environment.

Geography

The need for social, economic and environmental change to be sustainable. Pupils as contributors to society and to the environment.

LLW: Local and global citizenship

Human rights and social responsibility
Democracy and active participation.

English/Literacy and Maths/Numeracy

Pupils will also be able to develop their literacy and numeracy skills, depending on the optional creative or extension ideas you choose to use. These include developing their speaking and listening skills in discussion and role-play, factual and creative writing to create plays, letters, poems and reports; and to handle data from surveys.