

## About this lesson

Use these teaching ideas to support the topic of recycling or to enhance your students' knowledge of aluminium. You may find this useful to use before students begin the Alu D&T Challenge. Include one of the research ideas below to promote independent learning and develop students' investigation, IT and presentation skills, and a creative response that helps students reflect on their learning and share the importance of recycling.

Why not include peer feedback? Students can build on each other's ideas and provide constructive criticism of their verbal or creative responses, in order to extend and add depth to their learning and their understanding of the importance of recycling.

The ideas also provide a framework through which your students could also research the life cycle and importance of recycling other materials, including other metals or alloys, plastics, paper or glass.

### LEARNING OUTCOMES

By the end of the lesson, students will be able to:

- Name some ways aluminium is used in the world around them.
- Explain how recycling can reduce the environmental impact of using aluminium.
- Share their ideas and promote recycling in a poster or other creative work.

### RESOURCES

- Aluminium recycling video

You will also require additional resources from your school, to deliver your own creative approach.

Web links on uses of aluminium:

- [http://www.riotintoalcan.com/ENG/ourproducts/1542\\_aluminium\\_and\\_its\\_uses.asp](http://www.riotintoalcan.com/ENG/ourproducts/1542_aluminium_and_its_uses.asp)
- <http://www.rsc.org/periodic-table/element/13/aluminium>
- <http://www.hydro.com/en/About-aluminium/Why-aluminium/How-we-use-aluminium/>
- <http://www.hydro.com/en/Press-room/Videos/Video-Aluminium-A-surprisingly-big-part-of-life/>
- <https://en.wikipedia.org/wiki/Aluminium#Applications>

### STARTER

Ask students to get into pairs or threes and answer these three questions in their groups:

- What is aluminium?
- Where does aluminium come from?
- What do we use aluminium for?

Give students a few minutes to discuss their ideas then ask groups to report back to the class. Establish that:

- Aluminium is a metal.
- Aluminium comes from the ground (aluminium ore - bauxite - is mined and then processed to create the metal).
- Aluminium is used all around us, including for cooking foil and foil trays, drinks cans, and aerosols.
- Aluminium is endlessly recyclable.

### MAIN ACTIVITIES

Ask students to think of what they and their families do with used aluminium drinks cans, foil trays, empty aerosols or other packaging:

Do they just throw it in the bin, for it to become waste?

Or do they store it separately for it to go somewhere else instead?

Establish that we're all encouraged to recycle aluminium, for example by having a separate bag, box or bin at home for collecting recyclable materials, and that recycling means turning materials we've used and don't need any more into new products other people can use. If we do not recycle, these used materials can become landfill and we need more raw materials to make new aluminium instead.

Briefly discuss some other materials that we're all encouraged to recycle (examples include paper and card, plastics, glass and even food waste, which can be composted and used again to fertilise crops or generate electricity).

## EXPLORE THE RECYCLING VIDEO

The recycling video helps students understand the importance of recycling aluminium foil, trays, drinks cans and other items. You may find it helpful to use these discussion questions during or after the video:

- What aluminium products do you see being recycled?
- What other aluminium items could you also recycle?
- Where can you put aluminium products for recycling?
- What about larger aluminium items, like an old bike frame?
- What does the recycling logo look like?
- What can you do if there isn't a recycling point nearby?
- What happens to aluminium that has been sent for recycling?
- What was the recycled aluminium made into?
- How many times can aluminium be recycled?
- How is recycling aluminium good for the environment?
- How does recycling aluminium help preserve natural habitats around the world?
- How does recycling aluminium reduce our contribution to climate change and global warming?

## IDENTIFY REASONS WHY RECYCLING ALUMINIUM IS IMPORTANT

Ask students to get into pairs or threes. Remind students that we are all encouraged to recycle – but why? Ask each pair or group to think of reasons why recycling is good for the environment, linking their reasons to simple stages in aluminium production (mining and processing the ore, manufacturing products, and used materials being sent to landfill) and to any reduced contributions to climate change. How does recycling more aluminium reduce the environmental impact of each stage, for example through less mining, less processing and less landfill?

Share ideas. Reasons to recycle include:

- We need to extract fewer raw materials from the ground, which can help protect habitats and wildlife.
- Recycling can use much less energy than mining and processing raw materials.
- Because it uses less energy, recycling can reduce our contribution to climate change and global warming.
- It reduces waste, so less landfill space is required.
- It can result in much less pollution.
- It can create local jobs.

Uses for recycled aluminium include:

- Drinks cans (this is the most common use of aluminium in packaging. The aluminium drinks can is the most recycled packaging container in the world.
- Aerosols
- Food containers (not crisp packets or most food wraps – these are plastic film)
- Bike frames and wheels
- Car engines and bodies
- Alloy car wheels
- Aircraft frames and bodies

- Building cladding and frames
- Beer kegs for pubs
- Wires for electricity transmission
- Cooking pots and pans
- Foil layers in food packaging, like fruit juice cartons
- The metal layer in CDs and DVDs
- Tent poles
- Golf clubs and tennis rackets
- Scooters, inline skates, greenhouse frames, window frames, caravans, solar panels....

## RESEARCH IDEAS

Students could research one of the topic suggestions below to create a report, video, poster or other response.

- Properties of aluminium
- The range of aluminium alloys and how each one is used
- How aluminium is mined and processed
- Ways to work and shape aluminium (see page 9 in the Alu D&T Challenge guide)
- Uses for aluminium
- How recycling changes a product's life cycle from linear to closed-loop
- The positive environmental impacts of recycling and why it's important to recycle
- Examples of great responses to the 6 Rs of recycling (see page 8) – students could create a poster for each 'R' to display in your D&T room
- Examples of great responses to the six design questions (see page 7) – students could create a poster for each question to display in your D&T room.

## CREATIVE WORK IDEAS

**Computing / ICT link:** Students could storyboard and film a promotional video to encourage recycling, using vox pops, actors or computer animation, or could animate a video that shows the importance of recycling and how this changes a product's lifecycle from linear to closed loop.

Students could use word processing or design software to create their own posters or other campaign materials to encourage young people and families to recycle more aluminium items. These could link to your Eco-Schools activities or eco-club.

**English link:** Students could use persuasive writing and letter-writing skills to write a letter encouraging people to recycle, and could email their letters to your local newspaper.

Students might also develop a script for an assembly presentation or for one of the video ideas above; write an article on the importance of recycling suitable for publishing on a website or in a magazine or newspaper; or script a TV news item on recycling.

**Art & Design link:** Younger or less able students could use the KS2 poster template, while older students can design their own posters from scratch.

Ask students to design their poster in a particular graphic style. This could reflect an historic art period or the designs and styles of a contemporary youth culture.

## PLENARY

Invite students to share their creative work. Discuss where and how students could share their work so they can have the maximum impact. Ask them to share how creating their work has encouraged them to think more about why recycling is important.

Ask students to recall the important reasons to recycle they identified earlier in the lesson. Briefly share ideas.

Encourage students to think of these good reasons to recycle whenever they have the choice to recycle or bin aluminium or other recyclable waste – what will they do in the future?

### CURRICULUM LINKS

See the Alu D&T Challenge guide for core D&T curriculum links. Researching aluminium production and/or the benefits of recycling will also link to your geography curriculum:

#### **England** **Geography KS3**

Human geography – Economic activity and the use of natural resources; impact of human processes on landscapes, environments and climate.

#### **Wales** **Geography KS3**

Range – People and the planet; people as consumers; tomorrow's citizens.

#### **Scotland** **Social Studies**

People, place and environment SOC 3-08a; People in society, economy and business SOC 3-17b.

#### **Northern Ireland** **Geography KS3**

The interrelationships between physical and human environments; the ways in which places are interdependent; the need for social, economic and environmental change to be sustainable.

Depending on your approach, students' creative work can also support English, art and design, and/or ICT.