

2 3 1 b Metals

Preparation

- Read pages 34 - 35

Resources

- Examples of the various types of metals and the products from which they are made
- Soldering iron and stand
- Solder
- Populated and soldered PCB

Key Points Metals in commercial packaging

- Embossed or
- Debossed
- Surface textures
- Visual appeal
- Suggests quality

Suggest teacher finds an image of an aluminium drinks can

- Standard sizes and shapes
- Custom made styles

Suggest teacher finds an image of an aerosol can

- $\frac{3}{4}$ of drinks cans;
- 15% aerosol cans made from aluminium

- Aluminium
- Non ferrous
- Does not rust
- Strong
- Lightweight
- Easily moulded

- Added security
- Tampering obvious

Suggest teacher finds an image of tamper proof aluminium drinks can pull tab

- Why are metal packages used for Christmas, not just for life?
- 34% aluminium drinks cans are recycled
 - ⇔ 5 million dustbins!
 - Saves considerable amounts of energy over virgin manufacture
 - enough to run a TV for 3 hours for 1 recycled can!

- Tin alloys with the majority of metals
- Low melting point
- Ideal ingredient for solder

Suggest teacher finds an image of soldering a printed circuit board with a soldering iron

Suggest teacher finds an image of a tin coated steel food canister

- Cold rolled steel Lightweight Easily moulded
- Coated with thin layer of non toxic tin

- Cold rolled steel also used for aerosol cans

Suggest teacher finds an image of an aerosol can

- Steel is produced from iron ore, widely found and mined
- High energy process to separate it from other materials
- 75% less energy used by recycling over virgin metal
- 51% of steel is recycled
- Separated by powerful electro-magnets. A ferrous metal

Wider study

- FACTFILE:** Read up Stainless Steel Duralumin (page 35)
- All about metals <http://www.technologystudent.com/designpro/metals1.htm>
- Manufacture of aluminium from alumina, extracted from bauxite, a high energy process;
Tin is smelted from cassiterite (tin oxide) in a reverberatory furnace and then refined further to remove impurities
<http://www.btinternet.com/~hognosesam/gcse/page18.html>
- Manufacture of steel (Sounds good with speakers!)
<http://www.btinternet.com/~hognosesam/gcse/page15.html>
<http://www.btinternet.com/~hognosesam/gcse/page16.html>
- Metal Packaging Manufacturers Association <http://www.mpma.org.uk>
- Commercial D&T programme Focus Resistant Materials/Metals

Assignment

- Think about all this when you are next using canned food and drink!

Homework

- As above

Revision questions

1. Explain why aluminium is suitable for drinks cans

Specification and Learning Objectives

Aesthetic, functional and mechanical properties, application and advantages/disadvantages of the following metals for graphic products and commercial packaging:

- ferrous
 - steel
- non-ferrous
 - aluminium
 - tin
 - alloys
 - stainless steel
 - duralumin

Solutions to revision questions

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1. Explain why aluminium is suitable for drinks cans

- It can be printed on directly / total graphic coverage
- Relatively inexpensive material to produce in quantity
- Widely available material
- Does not rust /
- Does not contaminate the contents
- Internal coating prevent contamination
- Can be recycled
- Can withstand high internal pressure / structurally strong
- Lightweight due to thin wall