

Problems with Polymers

All (Grade C)	Most (Grade B)	Some (Grade A/A*)
Identify problems of with the disposal of polymers	Describe how disposal of polymers can be tackled	Analyse the social, economical and environmental issues surrounding the disposal of polymers

KEYWORD: Biodegradable, Incinerate



What does biodegradable mean? Break the word up = 'bio' 'degrade'

Write your definition

EXT: What material are biodegradable

Where does it go?

- Most of the rubbish in the UK goes to landfill. As most polymers are not **biodegradable** they will just stay there.



Are there any other ways of disposing polymers?



Incineration

- Some waste is burnt.
- This produces energy – which can be used to generate electricity.
- Many produce toxic substances though, which can be removed from the waste gases, but the toxic ash must be disposed of carefully.



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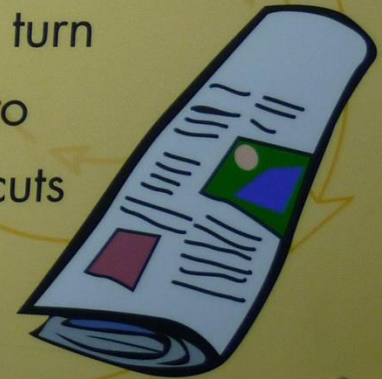
MOSI puts recycling at heart of new building

Recycled materials will be a key theme in the newly-developed main building at MOSI when it opens to the public later this year. Recycled concrete, steel, wood fibre, banknotes and tiles are amongst the materials reused by the Museum in its £7million makeover, and these will be demonstrated in an interactive trail about recycling throughout the main building.

MOSI Learning Manager Iain Morley said: "Recycling is an important part of the ethos of MOSI's redeveloped building and of the Museum itself. The site was once a railway station and has been re-used as a Museum, so it seems only fitting that recycled materials are part of the new fabric too. People are increasingly aware of recycling of domestic waste but this trail will encourage good practice in recycling of building waste as well. I'm delighted that the Carbon Innovation Fund has supported us in this aim."

Why does recycling paper save energy?

The total energy needed to make new paper includes the energy used to manage forests, cut down trees, transport the wood and turn it into pulp, as well as the energy used to make the paper. Using recycled paper cuts out a large part of this process so saves energy.



Why does recycling glass save energy?

The raw materials which are used to make glass contain calcium carbonate which has to be burned off in the furnace before glass can be made. When glass is recycled the calcium carbonate has already been burned off so less energy is required.



Why does recycling aluminium save energy?

Bauxite, the main raw material in aluminium, has to be mined then processed with chemicals at high temperatures to produce aluminium. When aluminium is recycled these processes are not required so less energy is used.



To generate enough energy to make a **newspaper** from new or recycled materials you need to turn the handle for 20 hours.

But you would have to put in a lot more effort if you used new materials!



NEW

It takes 3,000 kilowatt-hours to produce a tonne of paper from raw materials. That's the same as leaving your bedroom light on for nearly six years!

RECYCLED

It takes 1,500 kilowatt-hours to produce a tonne of paper from recycled materials. That's a 50% saving in energy.

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RECYCLED

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50% saving
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To generate enough energy to make a
one-litre bottle from new or
recycled materials you need to turn
the handle for **17** hours.

But you would have to put in a lot
more effort if you used new materials!



NEW

It takes 1,700 kilowatt-hours
to produce a tonne of glass
from raw materials.
That's the same as making
over 5,000 cups of tea!

RECYCLED

It takes 1,300 kilowatt-hours
to produce a tonne of glass
from recycled materials.
That's about a 25% saving
in energy.

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NEW

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RECYCLED

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ne of glass
materials.
25% saving

To generate enough energy to make
a drinks can from new or
recycled materials you need to
turn the handle for **five** hours.

But you would have to put in a lot more
effort if you use new materials!



NEW

It takes 14,000 kilowatt-hours
to produce a tonne of
aluminium from raw
materials.

RECYCLED

It takes 700 kilowatt-hours
to produce a tonne of
aluminium from recycled
materials. That's about a
95% saving in energy.

Reuse or Recycle?

Both have their benefits, but be aware that they are different.

Can you spot the items that have been reused?



ResultsPlus

Watch Out!

Reuse means using an item or material again, not throwing it away after a single use. Recycle means the materials in an item are processed and used to make new objects!










has been reused

Recycling Polymers

Recycling is a hot topic! I'm sure you all have recycling bins at home for food waste, paper and tins.

Recycling of polymers is possible for some types but is more difficult because they have to be sorted into different categories

symbol	polymer	uses
 PET	poly(ethylene) terephthalate	some bottles, food trays, duvet fillings
 HDPE	high-density poly(ethene)	some bottles, buckets
 PVC	poly(chloroethene)	soft toys, window frames
 LDPE	low-density polythene	cling film, bags
 PP	poly(propene)	crisp packets, carpet, ropes
 PS	poly(styrene)	egg boxes, foam packaging
 OTHER	other polymers	

Biodegradable Polymers

Most polymers are not **biodegradable**.

Q – What is one advantage and one disadvantage of this?

New scientific advances have allowed chemists to develop polymers that will biodegrade over a long period of time.



Q. Explain why reducing the amount of plastic would be more advantageous



Whose opinion?

Using the cards, work as a table to decide which people might have said what.



1 Local government
waste manager

4 Recycling company
owner

2 Incinerator
manager

5 Environmental
campaigners

3 Plastics
manufacturer

6 Government scientist

EXT: Which of the people are against the recycling of polymers? Why are they against it, and what would you say to these people?



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Disposal of Polymers

Polymers have many uses, but the disposal of polymers can be difficult.

Your task is to complete an extended piece of writing, discussing the possible methods of disposing of polymers. Make sure to identify the advantages and disadvantages of each and include the social, economic and environmental issues.



Assessment





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