

The 6 R's – You must know all of these for the exam.

Recycling, Reuse, Reduce, Refuse, Rethink and Repair

Recycling – Recycling is the conversion of waste products in to new materials/products. Designers and manufactures must consider how their product will be disposed of at the end of its life; if it is not recycled it ends up in **LANDFILL** sites. There are three types of recycling that you must know.

As consumers, when recycling we can help by separating different materials for example taking the card sleeve off a microwave meal tray, we can also help by making sure the material are clean, for example cleaning the microwave plastic tray. Other ways to help recycling could include taking off caps, crushing down materials and removing labels.

- **Primary recycling** - Items that are simply used again, for example items sold in charity shops. Products are no re processed in any way
- **Secondary or physical recycling** - Waste materials are recycled in to different types of products, for example – drinks bottles cut open and used as plant pots
- **Tertiary or chemical recycling** - This is when products are broken down and reformulated, for example – plastic bottles can be recycled in to fibres and then re-spun in to polyester to make fleece fabric which can be made in to blankets and clothing
- **Think of two more examples for each type of recycling?**

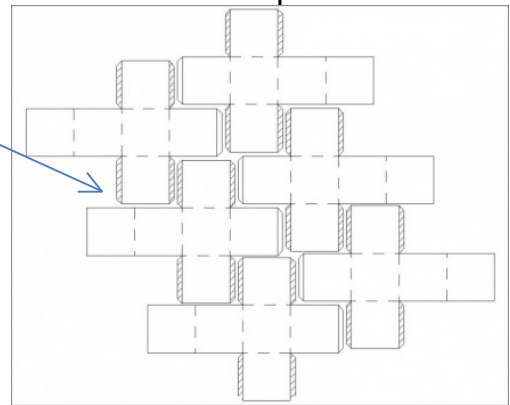
Materials that can be recycled include card, paper and aluminium.

Reuse - Customers can extend a products life by using it again e.g. – refillable printer cartridges. Some people re-use products for other purposes e.g. using an old bottle as a flower pot

- **Explain the advantages of re-using products**

Reduce - A new product progresses through a variety of stages, from the original idea to its decline, where it might be discontinued or disposed of. You must consider the impact of a product on the environment and its impact on society as a whole. The main stages involved are:

- The raw materials: how are they harvested/made?
- The production process: how is the product made?
- Transport and distribution: you need to consider what, how, where and the cost; for example you could reduce your carbon foot print by refusing products imported by air, **why?**
- Uses: what are the intended uses of the product? How will it be used by the client or customer?
- Recycling: how can the product be recycled?
- Care and maintenance: what is needed, how much and is it environmentally friendly?
- Disposal: the waste from manufacturing or the product itself. Ask yourself the question 'is it recyclable or biodegradable?'
- Waste: How can waste be minimised during production – for example nets are tessellated when they are Die cut



Eco footprint (Reduce) - This is the term used to refer to the measurement of the effect of our actions on the environment. You as a designer must consider the effect of your product on the environment from the first stages of your design ideas through to the final making and eventual disposal or recycling of your product. Your footprint involves showing that you have designed the product with the environment in mind and have tried to minimise the damage caused by the various stages throughout your products life cycle.

Built-in obsolescence (Reduce) - This is where the product has been designed to last for a set period of time. The functions of the product have been designed by the manufacturer to fail after a certain time limit. The consumer is then under pressure to purchase again. This built in obsolescence is in many different products, from vehicles to paper cups, light bulbs and items of clothing, and in food 'use by' or 'best before' dates.

Energy and waste in the production process (Reduce) - The consumption of non-renewable energy resources is causing an energy crisis, these resources will eventually run out and are called **FINITE** resources.

- How does the use of non-renewable resources impact on the environment?

The transportation of products is a high user of oil and petrol – refined fossil fuels. ‘Green energy’ is the leader of alternative energy sources, which are considered environmentally friendly and non-polluting. Energy can be generated from such natural sources as:

- Wind power, Solar power, geothermal, Hydro power and Tidal/wave

What are the advantages/disadvantages of solar and wind power?

Waste (Reduce) - We waste consumable products or it can be power sources. Waste management is a growing problem, from chemicals that get in to the water system, to paper and card used in packaging. Switching off our computers or not leaving the TV on standby can help reduce the amount of energy wasted.

Think about all the ways you could reduce waste in your day to day life.

Refuse - The processing, manufacturing, packaging and transport of our products uses huge amounts of energy and creates lots of waste. As consumers we can choose to refuse products that create unnecessary waste. You need to look at the sustainability of a product from an environmental and social view point. We need to consider how the product is made and if we can ensure that little or no harm is created in the environment by its method of manufacture.

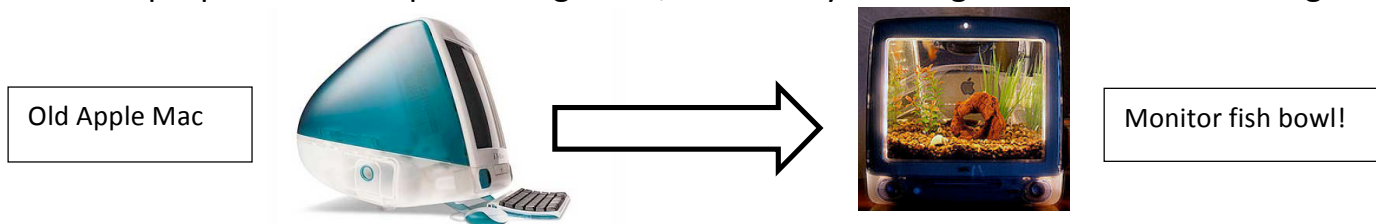
Materials we should refuse to use – Why should you **refuse** to use some products? The answer includes a variety of reasons including:

- The product is made unnecessarily from a manmade source instead of natural
- It might be because of toxic chemicals used in the product
- What about the manufacturing process itself – has it been made under appropriate safety regulations?
- What about the rights of workers and the conditions they have been working in?
- Packaging and transport distances and costs
- It might not be good for you (e.g. high fat content)
- You should think about these issues before you accept a product and, above all, don’t buy it if you don’t need it! Think of examples for each of the above

Rethink - Within our own lifestyle and that of others close to you, you need to **rethink** about your lifestyle and the way you buy products and the energy required to use them.

Society is constantly evolving and changing and you can evaluate how you could make a difference.

Using an existing product that has become waste; using the materials or components for another purpose without processing them, what can you design? What could be designed?


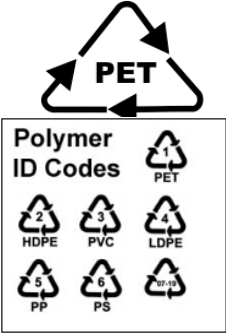






Repair - Today's throwaway society means we often buy new products rather than repairing them

- Some products you can repair yourself, think of an example....
- Some products are beyond repair or would cost too much to fix
- Unwanted electronic and electrical equipment is the fastest growing waste area, why?
- How could we reduce electronic waste?

Complete the table below	
Recycle	Products that can be recycled or use recycled materials
Reduce	
	To say no to a product because of the way it is manufactured, too much waste, pollution, where it's transported etc
	To approach design problems differently
	To fix or mend a product to prolong its life
Reuse	

Symbols - Symbols should be easy to understand, ideally identifiable across the globe and use few colours, if any. Often symbols are just black as they will be printed on corrugated card outer packaging boxes.

Symbol	Meaning	Design your own version of this
	<p>The 'Keep Britain Tidy' symbol is regularly seen on packages in the UK. It is there to remind people to place their rubbish in a rubbish bin rather than dropping it on the floor. It is also aimed at making people aware that they have a responsibility to keep the environment around them tidy and litter free. Sometimes the symbol is called the 'be environmentally friendly' symbol</p>	
	<p>POLYTHENE TEREPHTHALATE (PET) is a material widely used for packaging, especially drinks containers. It is 90% recyclable and the symbol opposite reminds the consumer of this fact. Hopefully the consumer will place the used packaging in the recycle bin, if he / she can find one. Thermo-plastic recycling symbols are also found to have a number in the middle; this refers to the type of plastic it is so it can be sorted for recycling.</p>	
	<p>The green dot symbol means that the company has paid (a financial contribution) towards recycling</p>	
	<p>A symbol that is occasionally seen on packaging is the Fair Trade symbol. This means that the content of the package has been produced in the Third World and that the producer (i.e. the farmer) has received a fair and realistic price. It also means that the produce is not from countries whose Governments help their industry / agriculture undercut those of much poorer countries by giving them subsidises</p>	
	<p>Card packaging with this symbol means that the materials used to make the packaging have been harvested from sustainable forests. This means that the forest is managed in such a way that the trees are replanted so that trees that are cut down are replaced</p>	
	<p>The Ecolable is a scheme managed by the European Union. It was established in 1992 and aims to promote products and services that are environmentally friendly. Companies and businesses that use this symbol / label have shown consistently, that they sell products and services that conserve the environment. For instance, a company that has reduced its carbon footprint can apply to use the ecolabel. A company that uses recycled materials in the manufacturing of its products or encourages recycling can also apply to use the symbol.</p>	



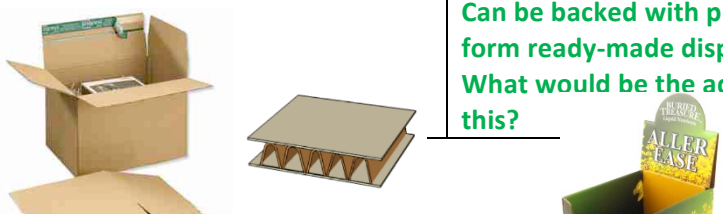



The wood pulp/ the trees used to make the original material comes from a managed and sustainable forest where trees are replanted when cut down

(Forest Stewardship council)

Design a symbol for wind, tidal and solar power

Advantages/disadvantages different packaging materials – complete the disadvantages

Material	Advantages	Disadvantages
<p>Laminate board</p> <p><i>Packaging manufactured from laminated card, is made up of paperboard (73%), plastic (22%) and aluminium foil (5%). It is commonly used for the packaging of drinks.</i></p> 	<p>Why is laminated card suitable for drinks cartons? You may wish to include some or all of the following key words / phrases</p> <p>Polythene layer - Fresh - Hygienic - Card - Tetra Pak - Lightweight – Printable</p> <p>cardboard, leak proof, holds liquids Protects against external moisture / contamination / taint Adds strength to carton,</p>	
<p>Glass bottles</p> <p><i>Made from sand</i></p> 	<p>Glass can be recycled Made from recycled material Reprocessed into a new glass product (re-blown) Glass is a sustainable resource Glass bottle can be washed out and then used again Can be reused</p>	
<p>Corrugated card</p> <p><i>Made from wood pulp</i> <i>Most packaging boxes are manufactured from corrugated fibreboard. This is fluted corrugated sheet, held between two flat boards.</i></p> 	<p>Corrugated fibreboard is used because it has a good strength to weight ratio. Packing boxes have a short life cycle from manufacture to recycling. These boxes can be readily recycled. It can be printed on Strong Can be backed with printed card to form ready-made displays What would be the advantages of this?</p>	

<p>Aluminium tins/cans</p> 	<p>Aluminium cans can be melted down Made into new products / cans Aluminium uses little energy to recycle Cost effective to recycle Aluminium is 100% recyclable / No need for sorting/separating aluminium cans, removing labels, single material Aluminium can reprocessed over and over without losing any of it's original properties Cans are easily squashed so take up less room</p>	

Exam tips

- **Never** simply write something is environmentally friendly as an advantage, explain why it is environmentally friendly and does it come from a sustainable resources? Is it recyclable?
- Look how many marks the questions is worth and try to make a point for each mark
- A two mark question is never a one word answer, explain your answer

Helpful Websites

www.recyclenow.com

www.technologystudent.com (look at Graphics, Product Design and Resistant Materials sections)

BBC bitesize – Design and Technology – Graphics

Revision guides CGP – GCSE D&T Graphics – OCR Specification – ISBN 978 1 84762 355 3

(Please note the recycling section in the revision guide is incorrect for this specification, the notes in this pack are correct)