



Flat Packed Charity Collection Boxes.

GCSE Product Design
Maximising exam success.

Manufacturing sustainability &
the 6Rs.

Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.

name.....

6R's and sustainability wordsearch

The 6R's are the 6 key things designers think about when designing products to be as sustainable as possible.

They are.....reduce, repair, reuse, recycle, rethink and refuse.



d	i	n	r	e	p	a	i	r	e	r	n	p
r	e	d	u	c	e	s	v	h	n	q	r	u
o	s	v	l	i	f	e	c	y	c	l	e	m
a	u	o	g	p	x	o	i	j	p	z	t	o
k	s	h	f	v	e	c	a	f	p	m	h	r
l	t	e	c	h	n	o	l	o	g	y	i	a
m	a	k	r	f	g	t	p	h	w	p	n	l
a	i	l	e	e	h	j	z	l	r	r	k	q
t	n	o	f	n	f	c	l	r	e	o	k	i
e	a	v	o	v	x	u	y	u	n	d	o	m
r	b	k	o	i	n	m	s	o	e	u	r	p
i	i	p	t	r	c	e	x	e	w	c	e	a
a	l	t	p	o	g	a	s	d	a	t	c	c
l	i	e	r	n	u	a	k	n	b	s	y	t
x	t	c	i	m	v	l	n	y	l	d	c	k
u	y	i	n	e	z	l	e	i	e	u	l	o
c	v	l	t	n	g	h	x	m	c	r	e	i
f	a	i	r	t	r	a	d	e	b	h	f	p

environment
recycle
moral
fairtrade
reduce
impact
lifecycle
reuse
material
people
products
refuse
sustainability
rethink
footprint
repair
technology
organic
renewable

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PRACTICAL ACTION
Solving problems and saving lives



Starter Activity:

It is important to understand the 6R's, sustainability and the environmental issues.

Knowing the key words and what they mean is essential as this is a topic which is regularly featured in the summer examination.

As a lesson warm up find the words on this word search.

name.....

Six Rs and Sustainability
wordsearch



d	i	n	r	e	p	a	i	r	e	r	n	p
r	e	d	u	c	e	s	v	h	n	q	r	u
o	s	v	l	i	f	e	c	y	c	l	e	m
a	u	o	g	p	x	o	i	j	p	z	t	o
k	s	h	f	v	e	c	a	f	p	m	h	r
l	t	e	c	h	n	o	l	o	g	y	i	a
m	a	k	r	f	g	t	p	h	w	p	n	l
a	i	l	e	e	h	j	z	l	r	r	k	q
t	n	o	f	n	f	c	l	r	e	o	k	i
e	a	v	o	v	x	u	y	u	n	d	o	m
r	b	k	o	i	n	m	s	o	e	u	r	p
i	i	p	t	r	c	e	x	e	w	c	e	a
a	l	t	p	o	g	a	s	d	a	t	c	c
l	i	e	r	n	u	a	k	n	b	s	y	t
x	t	c	i	m	v	l	n	y	l	d	c	k
u	y	i	n	e	z	l	e	i	e	u	l	o
c	v	l	t	n	g	h	x	m	c	r	e	i
f	a	i	r	t	r	a	d	e	b	h	f	p

- environment
- recycle
- moral
- fairtrade
- reduce
- impact
- lifecycle
- reuse
- material
- people
- products
- refuse
- sustainability
- rethink
- footprint
- repair
- technology
- organic
- renewable

Starter Activity:

Answers.

Now lets find out in more detail what these words mean.

Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.

Starter activity: What's the specification?

- **Working independently** - look at the two products in the images provided.



- Make a list in your exercise books of the **PROS** & **CONS** of both of these bags.

Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.

PROS

- Free to the consumer
- Readily available
- Biodegradable inks now added for natural decomposition.

CONS

- Bad for the environment
- End up in land fill
- Often non recyclable



PROS

- Long lasting/stronger/fashionable
- Can replace in the store of which bought for free
- Kinder for the environment/reduces use of plastic bags
- Can be repaired if required.

CONS

- Initial higher cost
- Relies on the consumer to remember to bring the bag each time they shop.
- Not water proof/resistant.



Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.

Tesco - Bags for Life



They encourage customers to refuse standard bags & rethink about how they carry their shopping in order to reduce the number of bags used.



Bag For Life
- can be reused, if it breaks it can be exchanged for a new one and the old one will be recycled.

The Natural Green Bag – A strong fabric bag which can be reused and repaired if needed.



Tesco's offer recycling of their standard carrier bags in all their stores.



FROM GARBAGE TO DIRT: The Decomposing Time line



What are the big sustainability issues for designers?

Resource use - We use so **much** and so **many** materials.



Many of the products we use daily use materials that are in **scarce** supply and are **non-renewable**.

If everyone in the world used as any resources as we do in the UK, we'd need **three planets** to sustain us.

Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.

Climate Change

Many products use a lot of energy to:

- Process materials and produce
- Transport
- Use and dispose

The Big issues



The energy used throughout the product 'lifecycle' releases carbon dioxide, which contributes towards climate change.

(Q) In terms of climate change what problems can this pose?

Write your response in your revision book. Discussion to follow.

Big issue

Impact on people

There are **people** involved at each stage of the development of a new product.

Make a list of all people who might be involved in the production, use and disposal of:



Fair trade ice cream



Non fair trade ice cream

(Q) Who are the people that benefit and who loses out throughout the whole of the product lifecycle?

Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.













The **6R's** could be a way of helping you think about the reducing the impact of a new product on the **environment** and **people**.

Activity:

Match the 6R's on your worksheet to their definitions. To save time simply draw an arrow matching up the definition to the title.

Once completed & checked these will be glued into your exercise books.

SIX Rs
Activity sheet

 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">RETHINK</div>	 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">Reprocess a material or product and make something else</div>
 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">REUSE</div>	 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">When a product breaks down or doesn't work properly, try to fix it</div>
 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">RECYCLE</div>	 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">Do we make too many products? Design in a way that considers people and the environment</div>
 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">REPAIR</div>	 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">Cut down the amount of material and energy you use as much as you can</div>
 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">REDUCE</div>	 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">Don't use a material or buy a product if you don't need it or if it's bad for people or the environment</div>
 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">REFUSE</div>	 <div style="border: 1px dashed black; padding: 10px; margin: 5px 0;">Use a product to make something else with all or parts of it</div>

Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.

How did you do? Check answers

- **RETHINK:** Do we make too many products? Design in a way that considers people and the environment.
- **REFUSE:** Don't use a material or buy a product if you don't need it or if it's bad for people or the environment.
- **REDUCE:** Cut down the amount of material and energy you use as much as you can.
- **REUSE:** Use a product to make something else with all or parts of it.
- **RECYCLE:** Reprocess a material or product and make something else.
- **REPAIR:** When a product breaks down or doesn't work properly, fix it.

Environmental Concerns in terms of materials, manufacture and disposal.

Often referred to as the 6 R's.

Six words beginning with the letter R.
Each describes an action that can be taken to reduce the environmental impact of products.

- Recycle
- Reduce
- Reuse
- Rethink
- Refuse
- Repair

It's important that designers do their part in taking these things in to account when designing new products.

In terms of your controlled assessment you need to discuss MESS development in order to access the top level band grades.

Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.

Recycling is where products are converted back to their basic materials and remade into new products.

Examples include:

Glass crushed, melted and made into new bottles.
Plastic bottles recycled into drainage pipes and clothing. (It takes 25 two litre plastic bottles to make one fleece.)

Designers and manufacturers of products need to design products for recycling. Many local councils now collect materials that can be recycled separately from normal domestic waste.



Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.



Consumers need to look to reduce the number of products they buy, or consider buying products that use less energy.

Manufacturers are looking to design products that:

- Have less materials in the product
- Take less energy to manufacture
- Need less packaging during transport.

Retailers can reduce carbon emissions by transporting products straight to the consumer from the place of manufacture, instead of via warehouses and shops.



Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.

Lots of items can be reused in the same form.

Glass milk bottles are a classic product that is reused. A more recent product that can be reused is a printer cartridge, which can be refilled.

Some products have filters that can be washed rather than using disposable, single-use filters.

Consumers could sell or donate products they no longer use themselves, so that someone else can use them.



Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.



Consumers can ask the question, “Do I really need this product?” (Do you really need to replace your mobile phone every year?)

Designers and manufacturers can make products that do the same job more efficiently.

They can design the packaging so that it is easier to recycle (for example, by making the packaging from a single material).

Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.

The consumer has the choice as to whether they buy /use a product or not.

They can ask the following questions:

- Should they refuse the product because it is too inefficient (in use, or in its use of materials)?
- Should they refuse the product because its packaging creates too much waste?

(Disposable cups from the coffee shop, plastic carrier bags from the supermarket, plastic water bottles.)

The designer and manufacturer have an increasing need to think about how the consumer will react to their products; will they refuse them?



Disposable



Refillable

Introducing the Six R's.

Rethink – Refuse – Recycle – Repair – Reduce – Reuse.



Instead of throwing things away consumers need to think more about having things repaired.

Designers have a responsibility to design products that can be repaired more easily.

It takes fewer resources to replace a part of a product, than to replace the whole item.

Could an item be upgraded instead of replace with a new one?



Global Responsibility.

AQA PD Core topic 6.



In this core topic we will be covering:

- **Recycling Symbols**
 - Sustainability
 - The 6R's
- Carbon Footprint
- Fair Trade
- Social Impact

Topic 6 Revision notes to be played on the hyperlink below.

<http://gcseproductdesign2015.weebly.com/section-b-topic-5--6.html>

Plenary Activity : Using 6 R's

Look at the **party bag** and its contents below.

Roll the dice you have and using the 6R sketch and make notes on how you could apply the “R” to this product in a way that considers people and the environment.



6R's and party bags



- Rethink: What could you do differently? Do we need party bags at all?
- Refuse: Are there materials you would choose not to use?
- Reduce: Can you reduce the packaging?
- Reuse: Can the bag or its contents be used again for another purpose?
- Recycle: Have you used materials that are easy to recycle when it's finished with?
- Repair: It is possible to mend any of it or will it go to landfill if broken?

6R's and Charity Collection Boxes

Using the same method as in the previous slide
Look at the example of a charity collection box.

Roll the dice you have and using the 6R sketch and make notes on how you could apply the “R” to this product in a way that considers people and the environment.



Some video clips on Recycling

<https://www.youtube.com/watch?v=Lx0aUk2AiNQ>

https://www.youtube.com/watch?v=vhmg6l_WNSE

<https://www.youtube.com/watch?v=5xlqz31x9yo>

<https://www.youtube.com/watch?v=zyF9Mxlcltw>

<https://www.youtube.com/watch?v=Bx0ozMweqoU>

Designers in action

To see examples of designers who include the six R's in their work. View

http://practicalaction.org/education/design_and_technology_profiles

Or sustainable companies

<http://practicalaction.org/sustainable-companies>

name.....

6R's and sustainability wordsearch

The 6R's are the 6 key things designers think about when designing products to be as sustainable as possible.

They are.....reduce, repair, reuse, recycle, rethink and refuse.



d	i	n	r	e	p	a	i	r	e	r	n	p
r	e	d	u	c	e	s	v	h	n	q	r	u
o	s	v	l	i	f	e	c	y	c	l	e	m
a	u	o	g	p	x	o	i	j	p	z	t	o
k	s	h	f	v	e	c	a	f	p	m	h	r
l	t	e	c	h	n	o	l	o	g	y	i	a
m	a	k	r	f	g	t	p	h	w	p	n	l
a	i	l	e	e	h	j	z	l	r	r	k	q
t	n	o	f	n	f	c	l	r	e	o	k	i
e	a	v	o	v	x	u	y	u	n	d	o	m
r	b	k	o	i	n	m	s	o	e	u	r	p
i	i	p	t	r	c	e	x	e	w	c	e	a
a	l	t	p	o	g	a	s	d	a	t	c	c
l	i	e	r	n	u	a	k	n	b	s	y	t
x	t	c	i	m	v	l	n	y	l	d	c	k
u	y	i	n	e	z	l	e	i	e	u	l	o
c	v	l	t	n	g	h	x	m	c	r	e	i
f	a	i	r	t	r	a	d	e	b	h	f	p

environment
 recycle
 moral
 fairtrade
 reduce
 impact
 lifecycle
 reuse
 material
 people
 products
 refuse
 sustainability
 rethink
 footprint
 repair
 technology
 organic
 renewable

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learning for the real world

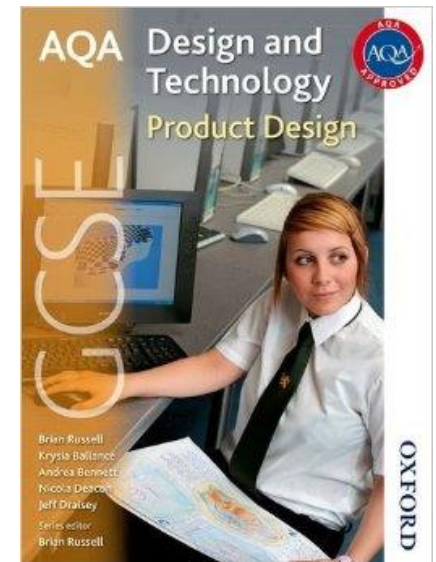


Activity:

Using the glossary in the Product design text book look up the meanings of these words.

Write down in your revision exercise book what the words mean. This will form revision notes for your personal use.

Next lesson we will have a quiz on their meanings.



Homework – Create your own revision notes.

This afternoon we have been looking at sustainability and the 6R's. This is a topic which crops up regularly in the exam paper and does feature in your mock exam.

For homework I would like you to read the information sheet, highlight the key words/terms and then make your own version on the blank document.

Revision Tip.
Often re-writing words helps you remember them.

The image shows two overlapping sheets of paper related to sustainability. The top sheet is a completed information sheet titled "SUSTAINABILITY" and "THE BIG PICTURE". It contains several sections:

- RENEWABLE RESOURCES**: Description: Renewable energy is made from resources that Mother Nature will replace, like wind, water and sunshine. Renewable energy is also called "clean energy" or "green power" because it doesn't pollute the air or the water. Resources listed: Wind, Solar, Hydro, Geothermal, Biomass.
- NON-RENEWABLE RESOURCES**: Description: Fossil fuels are non-renewable because they will run out one day. Burning fossil fuels generated greenhouse gases and is unsustainable (finite). Resources listed: Coal, Oil, Gas.
- CARBON FOOTPRINT**: Description: This term is used to denote the amount of carbon dioxide produced by your daily activities and use of material goods. Since CO2 is the most common of the greenhouse gases, you can determine your personal participation in global warming, you can prevent global warming, simply by changing some of your habits.
- LIFE-CYCLE ANALYSIS**: Description: Life-cycle assessment (LCA, also known as life-cycle analysis, ecobalance, and cradle-to-grave analysis) is a technique to assess environmental impacts associated with all the stages of a product's life from cradle to grave. Each stage of the life cycle is below...
- THE 6 R'S AND DEFINITIONS**:
 1. Raw materials
 2. Manufacture
 3. Transportation
 4. Use
 5. Disposal
 6. Recycling
 - Reduce: is it possible to reduce the amount of materials used when making the product?
 - Reuse: could the product have another use? Could its parts be used in other products?
 - Recycle: recycled materials used? Is product made from materials that are easy to recycle?
 - Rethink: is there a better way to solve problem that is less damaging to the environment?
 - Repair: if the product breaks can it be easily fixed without throwing away?
 - Refuse: not accepting things that are not good for the environment. Is packaging needed?

The bottom sheet is a blank template of the same information sheet, intended for students to create their own revision notes. It includes the same sections and icons (FSC, HDPE, alu, recycling symbols) as the top sheet.

A QUICK RE-CAP FROM LAST LESSON.

In your revision exercise book write today's date (8.1.16) and the title previous lesson quiz and answer these questions.

1



What am I?
Symbol name
& meaning.

2



What am I?
Symbol name
& meaning.



You have 10 minutes
to complete. Then
swap for peer
marking.

3

REPAIR.

What do I mean?
Can you explain
the definition.

4

Can you draw the **FSC
SYMBOL** & example
why it is used.

Can you draw my
symbol?

5



What am I?
Symbol name & can you
provide a product which
may be able to be
recycled using this
method?

6

REDUCE.

What do I mean?
Can you explain
the definition.

A QUICK RE-CAP FROM LAST LESSON.

In your revision exercise book write today's date (8.1.16) and the title previous lesson quiz and answer these questions.

1 Means that the product cannot be placed in a normal bin & needs specialist recycling facilities. Usually found on electrical products and batteries.



What am I?
Symbol name & meaning.

2



'Keep Britain tidy' logo. Encouraging people to respect their area and not litter.

What am I?
Symbol name & meaning.

4



The **FSC SYMBOL**. For every tree cut down, three more are replaced in its place.

Can you draw my symbol?

3

REPAIR.

To fix something instead of replacing or buying a new one. Reduce costs and waste of materials.

5



Symbol means that you can recycle glass bottles. (E.g.) green bottle glass, wine bottles, drinks etc. it can then be cleaned and reused or broken down into other products.

6

REDUCE.

Reduce the amount of materials in a product, take less energy/time to manufacture, less packaging. Consumers can reduce the amount they buy also.