Getting started with GCSE Design and Technology

Sustainability matters in Electronics

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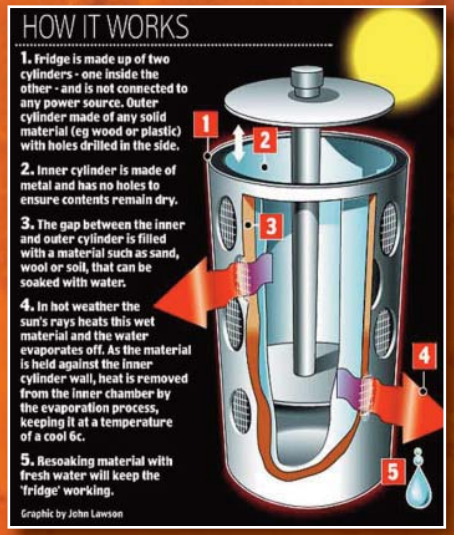
Inspirational designers and products

Wind up Laptop



Fridge that doesn't need electricity!

Solar lantern

Wind up shaver

There are some amazing designers and products out there.

Use the internet to find out more about one of the suggested companies in the following slide.

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Inspirational Electronics Designer

Eco-media player
(Trevor Baylis designs)

Glowstar solar lantern
http://practicalactionconsulting.org/glowstar/

Wind-Up MP3 Player
(Powerplus)
http://www.ethicalsuperstore.com/category/electronics-and-appliances/radios-and-media-players/

Find out about one of the companies on this slide and record

- Company name and logo
- Details of one or more products
- Anything about why they make their products in the way they do
- Anything else that interested or surprised you that you liked or didn't.

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You've looked at the work of a designer and their products....

Now write on a piece of paper any **words or phrases** that you think link to **SUSTAINABILITY** from the work of the designer or products you've looked at.

Make a class word bank

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So what's sustainability got to do with my GCSE in D&T?

Every **designer and maker** is making **choices** about the product they design. Lots of those decisions link to sustainability issues.

In your coursework and final exam paper – you will need to demonstrate your understanding of sustainability.

So let's get started.....

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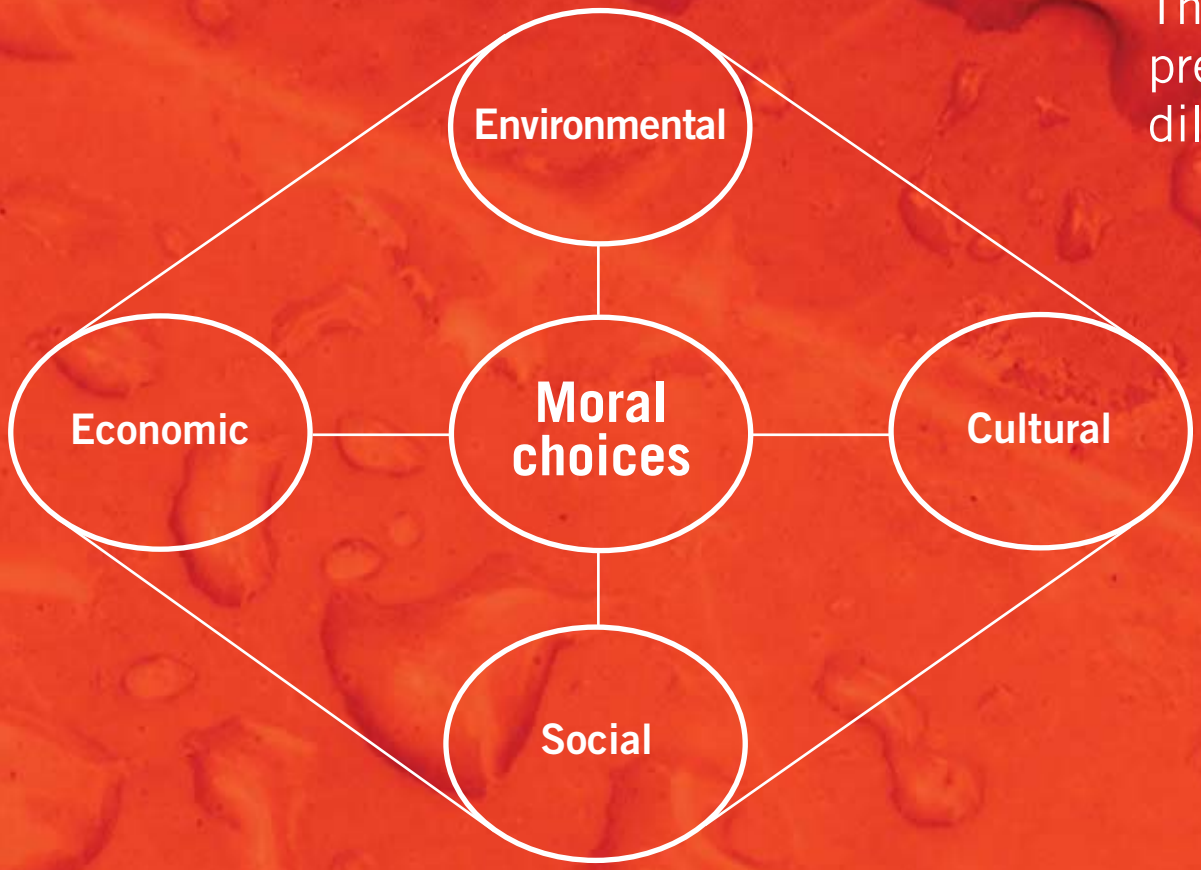
Sustainability has different dimensions. It's helpful to think of four main areas.



These dimensions can present **moral/ethical** dilemmas for designers.

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Four dimensions of sustainability – they all need to be considered.

Environmental

e.g. How much of the planet's resources does my product use?

Cultural

e.g. To what extent does my design affect cultural values and traditions?

Social

e.g. Is my product designed to improve the quality of life for its users?

Economic

e.g. Is everyone involved in the design, manufacturing, using and disposal of the product getting a fair deal?

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How do the four sustainability dimensions link to an MP3 player?

Using the sustainability dimensions diagram work out which labels from the MP3 player fall under each dimension.

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1 Gigabyte memory- huge music library

Is all music Ok for everyone to listen to?

Small and robust

Integrated flashlight and phone charger

Costs £39.95

Integrated wind up handle for powering the MP3 player- no batteries needed

Good sound control

http://www.ethicalsuperstore.com /category/electronics-and-appliances /radios-and-media-players/

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What's the problem for electronics designers?

A throwaway society?
Two million Pentium PCs end up in UK landfill sites every year.

Climate change
Washing machines, tumble dryers and dishwashers produce 5m tonnes of CO2 each year – the same as 32 million double decker buses.

Energy wasted
We buy 700 million batteries every year in the UK. 620 million are not rechargeable and only 14 million are recycled.

http://www.weeeman.org/

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Life cycle analysis

This can be used by electronics designers to help them understand the environmental impact of a product from extraction of materials to final disposal.

They try to work out the impact a product has by looking at

What materials were used to make it?
(e.g. plastic, metals, impact on land)

How and where was it produced?
(was it made overseas? What energy and water were used?)

How was it distributed?
(e.g. transported at each stage of the lifecycle? Ship, lorries, trains)

How was it sold and marketed?
(e.g. internet, flyers, shops)

How was it used?
(e.g. does it need electricity or batteries?)

How can it be disposed of? (e.g. charity shop, landfill site)

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In your designing and making it will help if you use life cycle analysis.

material choice

production

distribution

use

disposal

- You can show how making, selling, using and disposing of a product can have environmental impacts
- You can suggest ways of reducing those impacts
- You can show you have thought about the impacts on people (social), jobs (economic) and values/traditions (cultural)
- The following slides suggest how to do it by looking at different products

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Let's have a look at a drinks can...


Mining bauxite ore


Work conditions


Transporting ore


Factory making cans

Cans to drinks factory


Factory filling cans


Warehouse store


Cans to shops


Cans stored in shops


Cans taken home


Cans drunk


Cans thrown away


Cans collected


Recycling plant

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Now have a go yourself at LCA

Identify the main components of a mobile phone.
Choose one or two components and work out their environmental impact.

What materials were used to make it?
(e.g. plastic, metals, what impact did that have on the land)

How and where was it made?
(Was it made overseas? What energy use was involved in its manufacture?)

How was it distributed?
(throughout its lifecycle from sourcing to final disposal)

How was it sold and marketed?
(e.g. internet, flyers, shops)

How is it used?
(e.g. energy/batteries used?)

How can it be disposed of?
(e.g. charity shop, landfill site, recycling?)

Where's the impact of a smart phone during its life cycle?

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You know about product impacts, so how can you try to reduce them?

There are six ideas you can think about. All the exam boards use them so it makes sense to understand what they mean.

Activity

1. Try to match the words to the correct definition.

2. Think about how important each word is in making the world a more sustainable place. What's best? What's worst?

CLICK TO DOWNLOAD ACTIVITY

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

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How can you use the six Rs

Using the 6 R headings – develop your ideas to make a sustainable phone for the future.

What could you ***refuse*** to use? What could be ***recycled?*** What could you ***reduce?*** Is ***rethinking*** involved? Can you design so anything can be ***reused?*** Could it be designed for ***repair?***

If you're interested in more information on the impact of mobile phones go to http://education.practicalaction.org/urls/view/69

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How well did you get on?

REFUSE	Did you refuse to use any materials?
REDUCE	Did you reduce its energy consumption? Or packaging ? Suggest ways of manufacturing using renewable energy to power a factory?
REUSE	Did you design so any parts of the phone could be used again?
RETHINK	Did you think of other ways it could be powered? e.g. wind-up?
RECYCLE	Did you design so that recycling it is easier at the end of its life?
REPAIR	Did you design so that parts could be repaired or upgraded rather than using all new parts?

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How can you use the 6 Rs in your Electronics designing and making?

RETHINK does it need to use electricity to power it?

REFUSE to use non-renewable materials
to use any toxic materials or finishes

REDUCE the quantities so there is no waste
any packaging to a minimum
energy used in making to a minimum

REUSE any parts or materials at end of life

RECYCLE all unusable waste and parts at end of life
all packaging

REPAIR broken or worn out parts where possible

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