TASK 1: Evaluate the ways designers can reduce the impact on the environment when designing a product

(45 minutes):

Key question: How can designers, reduce the impact on the environment?

Choosing materials & processes

Designers can do a lot at the design stage to limited environmental impact. When thinking about their choice of materials they look at the following issues – this is sometimes called the 6R's:

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

You may recognise and understand some of these words. We will look in more detail as to how you use these words to help you consider the environment when you are a designer.
The fundamental steps are to use as little non-renewable energy and combustible raw materials to reduce the carbon footprint of your product.

Designers can do a lot at the design stage to limited environmental impact. When thinking about their choice of materials they look at the following issues:

If I design the product this way;
- **Can it be recycled as a whole product**
- **Can it be easily broken down into recyclable parts**
- **Am I using materials that can easily be recycled with little energy**

- **Is this a product that the world truly needs**
- **Will this impact people's lives positively**
- **Will I hurt the environment by designing and producing this?**

If I design the product this way;
- **Can it be repaired easily?**
- **Can parts be replaced when they break?**

The designer and manufacturer need to think about how the consumer will react to their products; will they refuse to buy them? Consumers 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?**

If I design the product this way;
- **Can I reuse parts from a previous design to reduce energy used in making new processing tools**
- **Can I use parts from another design**
- **Can this product be reused in another way when this purpose has been fulfilled**
- **Can parts be used for something else**

- **Can I reduce the materials used in this product?**
- **Can I reduce the air miles for finding this material?**
- **Can I reduce the parts and components required?**
- **Can I reduce the energy needed to produce this product?**

Global warning: an increase in the temperature of the Earth's atmosphere, caused by greenhouse gases.
Carbon footprint: the amount of CO2 emissions that can be directly or indirectly attributed to an individual's or company's activities.
6Rs: Rethink, Refuse, Reduce, Reuse, Repair, Recycle – environmental considerations for products

KEYWORDS

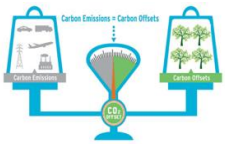
TASK 2: Evaluate the ways designers can reduce the impact on the environment when designing a product

(45 minutes):

Carbon Footprint

Companies should always be looking for ways to reduce their carbon footprint, for example by:

1. Maximising energy efficiency
   - Making sure that the smallest amount of energy possible is used.
2. Analysing their supply chain
   - Making sure the companies that supply materials, components and energy are as environmentally responsible!
3. Recycling
   - Use of recycled materials or being able to recycle the product at the end of its life
4. Using renewable energy
   - As much as possible using energy produced by solar, wind, tidal or other renewable means.
5. Identfied carbon offsetting methods that will reduce the overall ampunt of emissions
   - Many companies now do this – this means using other ways to offset the effect of the companies carbon footprint. Eg: Calculating air miles used by the company and paying a forestry company to plant a suitable number of trees to try and offset that carbon used.



Manufacture & Transportation: Energy usage

Designers can do a lot at the design stage to limited environmental impact. When thinking about the choice of manufacturing processes they look at the following issues:

- A fossil fuel is one that is not replaceable. For example, coal takes many millions of years to be produced. If we use up the coal, we will not have more supplies. Traditionally, industry is powered by fossil fuels. However, there is a move to change this and renewable energy is becoming more widely used in some sectors.
- Transporting materials/products burns fossil fuels too. Most cars/lorries still use petrol or diesel which is non renewable. Companies can decide to use more environmentally friendly transporting methods or even better, reduce the need for transporting by keeping purchases as local as possible.
- To investigate all of the elements of design, manufacture and selling a product. Designers use something called Life-Cyle Analysis (LCA). LCA is an organised register of environmental impacts at every stage of a products life.
  - Getting materials for making the product, Making the product, Moving the product, Using the product, Getting rid of the product when it is finished with
- Governments are moving towards LCAs being a compulsory part of the design process. This will help to reduce the impact on the environment.

Test your knowledge: Cover your notes & answer the following questions. You could write the answers or get someone at home to ask you & you tell them the answer.

1. ***Define the term global warming.***
2. ***Define the term carbon footprint***
3. ***Name all of the '6R's.***
4. ***Explain 2 things you might think about when applying 'reduce' to a product.***
5. ***What is meant by Life Cycle Analysis?***
6. ***Explain 3 ways designers can reduce the impact on the environment when creating a new design.***

Now check your answers using your notes! Was there anything you missed? How will you remember that next time?

KEYWORDS

Renewable energy: energy from a source that is not depleted when used, such as wind or solar power.
Supply chain: the line of processes involved in the production and distribution of a product.
Carbon offsetting: the process of compensating for CO2 emissions from industrial activity.

TASK 3: Identify how you can apply the 6Rs to a product in your own home

(80 mins):

Design challenge

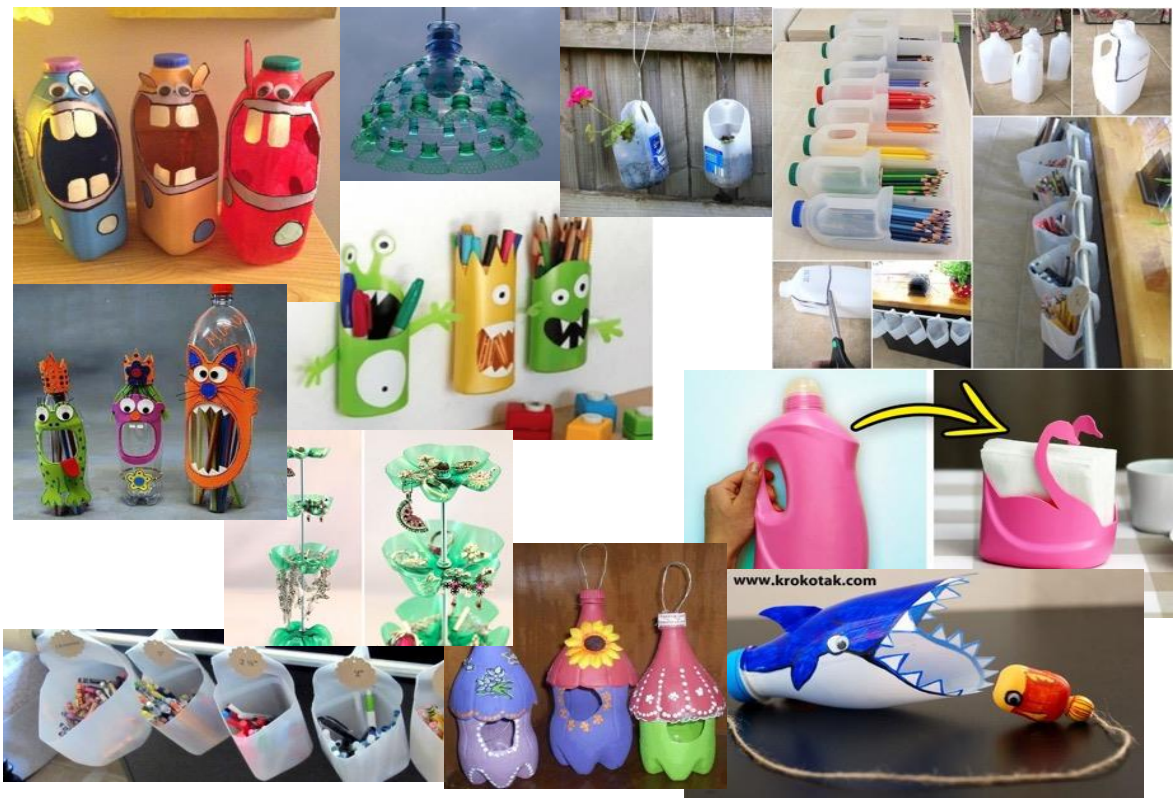
In this unit: You have learnt about the impact of new technologies on the environment. You have investigated the design process of one specific product - the toothbrush. You have watched the toothbrush go through a drastic redesign.

Now it is your turn to apply some of the principles you have learnt. Your own design challenge!

1 TASK:

- Identify an item in your house that was destined for the bin (waste bin or recycling).
- Think about how you can apply 'Reuse', 'repair' or 'recycle' to this product.
- On one A4 page, create a design for a product based on this item – give it a new life!
- Annotate your drawing to explain what you have created/changed/added and how it meets those three 'Rs' that have been identified.
- ***SUBMIT: a photo of your A4 page to your teacher*** *If you make the design then photograph that too.*

Extension challenge* – *can you make your design?* *There is a bit of inspiration below



H&S

If using a craft knife, glue gun etc. always protect yourself and the surfaces you are working on. Ask permission and get supervision.