

## Life cycle assessments (LCA)

### **Why are they useful?**

They can evaluate the environmental impact of a product; this is increasingly important due to climate change and the limit of years to reverse it. LCAs have increased the number of products that are able to be recycled and have made companies/factories aware of the environmental impacts of their products. Recycling reduces the energy used to create products as the raw materials are all ready gathered and if that product is non-renewable (will eventually run out) it means that it will run out slower and more products are able to be made for the global demand. Making products reusable limits the amount of energy going into making new products, henceforth less greenhouse gases (carbon dioxide, methane, and water vapour) are released into our atmosphere causing global warming. There will always be positives and negatives of all products but Life Cycle Assessments eliminate the guessing of whether it is a good product by judging it on a scale of 1 to 10, therefore the lower the total, the better the product is for the environment.

### **Life Cycle Assessment of a plastic bottle containing a smoothie**

An LCA has four stages: extraction and processing of the raw materials, manufacturing of the product and its packaging, using the product during its lifetime and disposing of the product at the end of its useful life.

#### Stage 1:

##### Packaging –

Crude oil is used to make plastic, crude oil is non-renewable, and the process of extraction uses a lot of energy and produces air, land, and noise pollution potentially damaging habitats. 1/10

##### Product –

Smoothies usually contain some sort of fruit/vegetables and a liquid (e.g. water or milk). Fruits and vegetables are renewable resources but may be damaging habitats by taking up the space for crops. Also, fruit/vegetables use a lot of water to be grown which can be scarce in some countries. Water is a renewable resource but the treatment of the water (making it potable) uses energy and a lot of space, potentially destroying habitats and reducing biodiversity. 3/10

#### Stage 2:

##### Packaging –

Once the crude oil is extracted, it must be separated in a fractional distillation chamber and then cracked into smaller monomers, polymerisation joins lots of the smaller monomers into polymers which is plastic. This requires a lot of energy and produces many fumes that are bad for the environment. This uses many machines and people as well as using up land for factories. 1/10

Product –

Once the product has travelled to the factory (releasing greenhouse gases) the fruits/vegetables must be prepared and then blended with the water. This uses many machines and people and the factory will be using up land that could be a habitat or used for other things such as housing. Putting the product into the packaging requires further machinery and people. 2/10

Stage 3:

Product –

The finished product will have to travel by lorry (refrigerated – more energy used) to the various shops and be placed in a refrigerator. Drinking the smoothie doesn't have an impact on the environment and the bottle can be re-used for other liquids. 6/10

Stage 4:

Product –

The product if not put in the correct bin will go to landfill, potentially polluting the sea or land. The bottle can be re-used by cleaning it either by the manufacturer or the consumer and filled with another liquid. Or it can be recycled, which requires less energy than extracting more crude oil, and made into another product. 4/10

Total:

17/60