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'LCA' stands for 'Life Cycle Assessment'. It looks at every stage in the manufacture, use and disposal of a product.

Look at the example below.

LCA questions	Paper cup	Synthetic polymer cup
What is the raw material?	wood	crude oil
Is the raw material from a sustainable source?	Yes – new trees can be planted.	No – when all the crude oil is used up it will be gone for ever.
What is the effect on the environment of: a getting the raw material b transporting the raw material c the manufacturing process d using the product e disposal: 1 landfill 2 incineration 3 recycling	Habitats are destroyed when forests are logged but forests can be managed to reduce the damage. Transport of logs creates air pollution. Harmful chemicals are used to make paper. Leaks of these chemicals can damage health and the environment. Transport of the cups produces air pollution. Paper rots in landfill, releasing carbon dioxide and methane. Paper can be burned, releasing carbon dioxide and water vapour. Paper can be recycled easily.	Leaks of crude oil at oil wells harms habitats. Leakage of crude oil from pipelines and tankers causes major damage to wildlife. Ships and lorries produce air pollution. Leaks during the refining of crude oil and making polymers damage health and the environment. Transport of the cups produces air pollution. Most polymers will not rot. Polymers can be burned but give off toxic gases, carbon dioxide and water vapour. Polymers are difficult to recycle.
What are the benefits?	People are employed in the manufacture and distribution of cups. Paper cups are convenient to use. Paper cups do not have to be washed.	People are employed in the manufacture and distribution of cups. Plastic cups are lighter than paper and less likely to leak. Plastic cups do not have to be washed.
How does energy use during the lifetime of the product compare? i No recycling ii With recycling	i Paper cups use up about twice as much energy as plastic cups. ii Both materials use about the same amount of energy.	

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1

Which material comes from a sustainable source?

[1 mark]

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2

Is the manufacture of disposable cups from a) paper or b) synthetic polymers harmful to the environment? Give examples.

[2 marks]

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State which material is likely to cause most damage to the environment when it is disposed of?

[1 mark]

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Which material uses up the most energy in its life cycle? Explain your answer

[2 marks]

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Which material should be used for disposable cups? State your choice with your reasons.

[2 marks]

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(Total 8 marks)

End