Princess of Chocolate

9. You work as a person responsible for the environment at the company 'Princess of Chocolate'.

The company 'Princess of Chocolate' are going to introduce a new product: luxurious chocolate very worth its price. The company has developed three suggestions on packing for the chocolate. The packing's are made of plastics, aluminium and paper, respectively.

Plastic packing

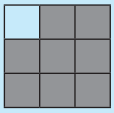
Aluminium packing

Paper packing

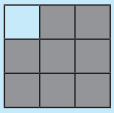
Your assignment is to write a proposal and give suggestions to the company management where you recommend one of the packing materials; plastic, aluminium or paper. This proposal is going to be used as a foundation for their decision.

In the proposal, you have to:

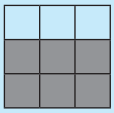
- **Use scientific information**
  by starting from the fact sheet about the three materials and deepen your reasoning with help from your chemistry content knowledge.



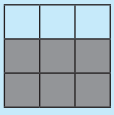
- **Take a position**
  by recommending **one** of the materials (plastic, aluminium or paper).



- **Motivate your position**
  by explaining why the material you recommend is the best choice.



  Your motivation shall build on the advantages and disadvantages of the three materials, regarding crude material, properties, energy demand in production, and recycling possibilities.



  Your comparisons and your thoughts about advantages and disadvantages have to be clear.

Fact sheet

		Material		
		Plastic	**Aluminium**	**Paper**
Aspects	**Crude material**	Plastics are mainly produced from crude oil. Oil is produced in countries outside of Sweden.	Aluminium is built of aluminium atoms. The metal is produced from the mineral bauxite which consists of aluminium ions. Bauxite is mined in countries outside of Sweden.	Paper is produced from wood. Wood is a renewable resource. The main part of the crude material for paper is from Swedish woods.
	Properties	Plastics are easy to form and colour with quite low energy consumption. Some plastics will not let fragrances, air or water through.	Aluminium is easy to form and has relatively low energy consumption. Aluminium has good corrosion durability. Aluminium will not let fragrances, air or water through.	Paper is easy to form and colour with relatively low energy consumption. Paper will let fragrances, air or water through.
	Energy demand in production	Approx. 20-90 kJ/g	Approx. 150 kJ/g	Approx. 12 kJ/g
	Recycling possibilities	Combustion of plastics contributes to the negative greenhouse effect. Most of the plastic packing is combusted and the energy can be used as district heating. Some plastics can be recycled. 1 kg of recycled plastics will lower the carbon dioxide emissions with 2 kg, in comparison with the production of new plastics.	Aluminium can be recycled and will keep its properties after melting. The production from the crude material is more energy demanding than recycling. When aluminium is recycled, 95% of the energy used in production of new aluminium, is saved. Aluminium is easier to melt than other metals.	The combustion of paper is not contributing to the negative greenhouse effect since it is a part of the carbon atom cycle. Every third packing made of paper is made from recycled paper. Paper can be recycled but after some recycle periods, the quality of the paper is getting worse.