3.6 EXPLORE AN ISSUE: THE COST OF YOUR COLD DRINK

Understanding the Issue

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1. A coolant repeatedly evaporates and condenses in the cooling coils. The coolant absorbs heat when it evaporates. This heat is extracted from the foods and drinks in the fridge, thus cooling them.
2. Ammonia, methyl chloride, and sulfur dioxide were used in the later 1800s. These substances are toxic. Freon was used in the 1920s. It is nontoxic and unreactive, but causes damage to the ozone layer in the upper atmosphere. Since the 1970s, HCFCs and HFCs have been used. Switching to these compounds may reduce environmental damage.
3. Propane (C_3H_8), butane (C_4H_{10}); since they do not contain halogens, they do not affect the ozone layer.
4. North American consumers prefer larger refrigerators and additional features, such as automatic defrost, that require much larger quantities of coolant. North American manufacturers are also reluctant to abandon older technology in which they have invested time and money.
5. [Sample answer] Consumers can influence manufacturers' decisions by writing to manufacturers, offering concerns and suggestions; organizing information sessions and inviting representatives from manufacturers; writing letters to newspapers; contacting politicians, such as government environmental agencies; informing retail outlets of their preference; and not buying products that do not meet consumers' expectations.

Role Play: Choosing a Refrigerant

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(a) [Sample answer] One other way of measuring cost is the political cost. Local politicians have to think about what is best for their constituents, and what will help them get re-elected. Union reps must consider the political cost, for their union, of supporting one type of coolant over another. If choosing one type of coolant results in fewer fridges being sold, and therefore fewer being ordered and manufactured, the union members might be unhappy with the union reps who chose this course of action, and withdraw their support. If union reps support the most environmentally friendly option, union members might applaud their ethical stand, and support them politically.

(b) [Sample answer] As the local MP, I would be very anxious to bring well-paying jobs to my community. I would probably back the technology that would result in the most jobs, and ensure some stability for those jobs. If we could get a Greenfreeze research lab built in the area, as well as the manufacturing facility, we would have even more jobs. I would win support for helping to preserve the ozone layer. However, I would have to be confident that the Greenfreeze refrigerators would sell well, otherwise my constituents would be laid off from the factory. My popularity would decline and I might lose me my seat in office.

(d) [Sample answer] Points in favour of HFCs and HCFCs: proven technology, minimal changes for manufacturers to production lines, an improvement on the old CFCs, refrigerators are likely to be cheaper and to sell well, HFCs and HCFCs are nontoxic and inert, unlike the butane in Greenfreeze.

Points in favour of Greenfreeze: even more ozone-friendly than HFCs and HCFCs, long-term health could improve, the technology already exists in Europe, North Americans would have environmentally friendly options when choosing a refrigerator, the publicity of introducing a new technology would help sales.

3.7 ALCOHOLS AND ETHERS

PRACTICE

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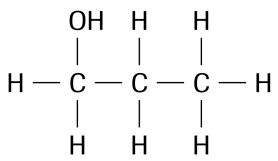
1. (a)



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