

Using materials – GCSE Chemistry**1. No.6**

This question is about materials used to make plates.

Plates are made from ceramics, paper or poly(propene).

Paper plates are biodegradable and recyclable.

Which stage of a life cycle assessment (LCA) would contain this information?

[1 mark]

Tick (✓) **one** box.

Disposal at the end of useful life

☐

Extracting and processing raw materials

☐

Manufacturing and packaging

☐

Use and operation during lifetime

☐

Which **two** processes are used to make ceramic plates?

[2 marks]

Tick (✓) **two** boxes.

Forming a composite

☐

Galvanising with zinc

☐

Heating in a furnace

☐

Melting sand and boron trioxide

☐

Shaping wet clay

☐

Poly(propene) is produced from an alkene.

Complete the sentences.

[2 marks]

The name for very large molecules such as poly(propene) is _____.

The name of the alkene used to produce poly(propene) is _____.

The alkene needed to make poly(propene) is produced from crude oil.

Which **two** processes are used to produce this alkene from crude oil?

[2 marks]

Tick (✓) **two** boxes.

Chromatography

☐

Cracking

☐

Fermentation

☐

Fractional distillation

☐

Quarrying

☐

What type of bond joins the atoms in a molecule of poly(propene)?

[1 mark]

Tick (✓) **one** box.

Covalent

☐

Ionic

☐

Metallic

☐

Table 4 shows information about two polymers used to make plates.

Table 4

Polymer	Effect of heating the polymer
A	does not melt
B	melts at 50 °C

What type of polymer is polymer **A**?

Use **Table 4**.

[1 mark]

Why does polymer **A** behave differently to polymer **B** when heated?

You should refer to crosslinks in your answer.

[1 mark]

2. No.5

This question is about materials used to make food plates.

Food plates are made from paper, polymers or ceramics.

Table 2 shows information about plates of the same diameter made from each of these materials.

Table 2

	Food plate material		
	Paper	Polymers	Ceramics
Raw material	Wood	Crude oil	Mined clay
Number packaged in 10 dm ³ cardboard box	500	100	50
Average number of times used	1	400	1000
Biodegradable?	Yes	No	No
Recyclable?	Yes	Yes	No

Table 2 does **not** show information about energy usage.

Suggest **two** pieces of information about energy usage which would help to produce a complete life cycle assessment (LCA) for the three food plate materials.

[2 marks]

1 _____

2 _____

Evaluate the use of these materials for making food plates.

You should use features of life cycle assessments (LCAs).

Use **Table 2**.

[4 marks]

Describe how ceramic food plates are produced from clay.

[2 marks]
