

6.7 Energy from Biomass

Name: _____ Class: _____ Date: _____

Total: 10 marks

Objective

Build the skills to answer exam questions on **energy from biomass**.

You must be able to:

- describe **biomass** 生物质 energy (wood, crops, biofuels)
- explain that it is renewable but has impacts
- discuss carbon neutrality and air pollution

1 Worked examples

Study these first. Each one shows the method for a question type used later —follow the steps and you can do the Practice and Exam-style questions yourself.

■ Biomass energy

Biomass is energy from organic material —burning **wood**/crop waste, or making **biofuels** (ethanol from corn, biodiesel). It is **renewable** if replanted.

■ Carbon (near-)neutral

Growing biomass **absorbs** CO₂, and burning it **releases** the same CO₂ back —so it can be roughly **carbon neutral** over its cycle (unlike fossil fuels, which add ancient carbon).

■ Disadvantages

- Burning still releases **air pollution** (particulates).
- Growing biofuel crops competes with **food** production and can drive land clearing.
- Only sustainable if regrown as fast as used.

■ A worked judgement

Ethanol from corn is renewable and near carbon-neutral, but growing the corn uses land, water, and fertilizer and competes with food.

2 Practice

Now apply the methods above.

2.1 Give one example of biomass energy. [1]

2.2 Why can biomass be roughly carbon neutral? [1]

2.3 State one disadvantage of biofuel crops. [1]

3 Exam-style questions

3.1 Biomass can be considered carbon neutral because growing it [1]

- **A** releases CO₂
- **B** absorbs the CO₂ that burning releases
- **C** produces no gases
- **D** uses fossil fuels

3.2 A country grows corn to make ethanol fuel.

(a) State one benefit and one drawback. [2]

(b) Explain why biomass is renewable only if managed well. [2]

3.3 Explain why burning biomass is often considered better for the climate than burning coal. [2]

4 Go further

You are now ready for the real exam questions on this subtopic:

- work through the **6.7 Energy from Biomass** lesson on the **Learn** page;
- read the **Energy from Biomass** section of the AP Environmental Science handout on the **Know** page.

Solutions

2.1 Any one: burning wood/crop waste, ethanol, biodiesel.

2.2 Growing it absorbs the same CO_2 that burning releases.

2.3 Any one: competes with food, uses land/water/fertilizer, air pollution.

3.1 B —absorbs the CO_2 that burning releases.

3.2 (a) Benefit: renewable and near carbon-neutral; drawback: competes with food or causes air pollution. (b) It is renewable only if the plants are regrown as fast as they are burned; otherwise the resource is depleted.

3.3 Biomass returns recently-absorbed CO_2 (near carbon-neutral), while coal releases carbon stored for millions of years, adding new CO_2 to the atmosphere.