

6.6 Nuclear Power

Name: _____ Class: _____ Date: _____

Total: 10 marks

Objective

Build the skills to answer exam questions on **nuclear power**.

You must be able to:

- describe **nuclear fission** 核裂变 to generate electricity
- state advantages (no CO₂, high energy density)
- state disadvantages (radioactive waste, accidents)

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.

■ How it works

Nuclear power splits uranium atoms (**fission**), releasing huge heat that boils water to spin a turbine —generating electricity, like a steam plant but with a nuclear heat source.

■ Advantages

- Produces **no CO₂** during operation (helps climate).
- **Very high energy density** —a tiny amount of fuel yields a lot of energy.
- Reliable "baseload" power.

■ Disadvantages

- **Radioactive waste** stays dangerous for thousands of years and must be stored safely.
- Risk of **accidents** (Chernobyl, Fukushima) releasing radiation.
- High cost and **thermal pollution** of cooling water.
- Uranium is **nonrenewable**.

■ A worked judgement

Nuclear power is low-carbon and energy-dense, but the long-lived waste and accident risk make it controversial.

2 Practice

Now apply the methods above.

2.1 What process generates the heat in a nuclear plant? [1]

2.2 State one advantage of nuclear power. [1]

2.3 State one disadvantage. [1]

3 Exam-style questions

3.1 A climate advantage of nuclear power is that it [1]

- **A** produces no CO₂ during operation
 - **B** burns coal
 - **C** releases methane
 - **D** needs no fuel
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3.2 A country considers building nuclear plants to cut carbon emissions.

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

(b) Explain the main challenge of nuclear waste. [2]

3.3 Explain why nuclear power is low-carbon but still not fully renewable. [2]

4 Go further

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

- work through the **6.6 Nuclear Power** lesson on the **Learn** page;
- read the **Nuclear Power** section of the AP Environmental Science handout on the **Know** page.

Solutions

2.1 Nuclear fission (splitting uranium atoms).

2.2 Any one: no CO₂, high energy density, reliable.

2.3 Any one: radioactive waste, accident risk, high cost, thermal pollution.

3.1 A —produces no CO₂ during operation.

3.2 (a) Benefit: low-carbon, energy-dense power; drawback: radioactive waste or accident risk. (b) The waste stays radioactive and dangerous for thousands of years, so it must be stored safely for a very long time.

3.3 It emits no CO₂ during operation, but its fuel (uranium) is a finite mined element, so it is nonrenewable.