

Exercise walk-through

Hydroelectric Power ■ 6.9

eXercise

You must be able to

- describe how a **dam** 大坝 generates electricity
- state advantages (renewable, no CO₂) and disadvantages (habitat, displacement)
- explain effects on rivers and fish

Method — How it works

Hydroelectric power uses falling or flowing water (usually from a **dam**) to spin turbines and generate electricity. It is **renewable** and emits no CO₂ during operation.

Method — Advantages

- Renewable, low-carbon, reliable.
- Reservoirs provide water storage and flood control.

Method — Disadvantages

- The **reservoir floods** land, destroying habitat and displacing people.
- **Blocks fish migration** (e.g. salmon) unless fish ladders are built.
- **Traps sediment**, starving downstream areas of nutrients.
- Changes river flow and temperature.

Method — A worked judgement

A large dam gives clean, reliable power but floods a valley, blocks fish, and traps sediment — significant ecological trade-offs.

Practice 2.1 ■ 1 mark

What spins the turbines in a hydroelectric plant?

Solution 2.1

Method: How it works

Worked steps

Falling/flowing water (from the dam) **B1**.

Practice 2.2 ■ 1 mark

State one advantage of hydroelectric power.

Solution 2.2

Method: How it works

Worked steps

Any one: renewable, no CO₂, reliable, water storage/flood control **B1**.

Practice 2.3 ■ 1 mark

State one disadvantage.

Solution 2.3

Worked steps

Any one: floods habitat, displaces people, blocks fish, traps sediment **B1**.

Exam-style 3.1 ■ 1 mark

A major ecological drawback of a large dam is that it

- A** produces CO₂
- B** blocks fish migration and floods habitat
- C** uses fossil fuels
- D** cannot store water

Solution 3.1

Method: A worked judgement

- A produces CO₂
- B blocks fish migration and floods habitat** 
- C uses fossil fuels
- D cannot store water

Worked steps

B — blocks fish migration and floods habitat.

Exam-style 3.2 ■ 2 marks

A country builds a large dam for electricity.

- (a) State one benefit and one environmental cost.
- (b) Explain how the dam affects fish and sediment.

Solution 3.2

Method: A worked judgement

Worked steps

(a) Benefit: clean, reliable, renewable power; cost: flooded habitat / displaced people / blocked fish **B1 B1**. (b) The dam blocks migrating fish (unless fish ladders exist) and traps sediment, starving downstream areas of nutrients **M1 A1**.

Exam-style 3.3 ■ 2 marks

Explain why hydroelectric power is renewable and low-carbon.

Solution 3.3

Method: How it works

Worked steps

It uses the water cycle (endlessly replenished by rainfall) to generate power and burns no fuel, so it emits no CO₂ during operation **M1** **A1**.