

6.8 Solar Energy

Name: _____ Class: _____ Date: _____

Total: 10 marks

Objective

Build the skills to answer exam questions on **solar energy**.

You must be able to:

- distinguish **photovoltaic (PV)** 光伏 and **active/passive solar** 主动/被动太阳能
- state advantages and disadvantages
- explain intermittency

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.

■ Types of solar

- **Photovoltaic (PV) cells** —convert sunlight **directly** into electricity.
- **Active solar** —uses pumps/fans to move solar-heated water/air (e.g. solar water heaters).
- **Passive solar** —building design (windows, materials) that captures heat without machines.

■ Advantages

- **Renewable**, no CO₂ during use.
- No fuel cost; low maintenance; works off-grid.

■ Disadvantages

- **Intermittent** —no power at night or when cloudy (needs storage/batteries).
- Manufacturing has some impact; needs space; upfront cost.

■ A worked judgement

Solar PV is clean and renewable, but because it is **intermittent**, it needs batteries or a backup supply for constant power.

2 Practice

Now apply the methods above.

2.1 What does a photovoltaic cell do? [1]

2.2 What is passive solar design? [1]

2.3 Why is solar power called intermittent? [1]

3 Exam-style questions

3.1 A photovoltaic cell converts sunlight directly into [1]

- **A** heat only
- **B** electricity
- **C** biomass
- **D** wind

3.2 A home installs solar panels.

(a) State one advantage and one disadvantage. [2]

(b) Explain how the intermittency problem can be addressed. [2]

3.3 Explain the difference between active and passive solar heating. [2]

4 Go further

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

- work through the **6.8 Solar Energy** lesson on the **Learn** page;
- read the **Solar Energy** section of the AP Environmental Science handout on the **Know** page.

Solutions

2.1 Converts sunlight directly into electricity.

2.2 Building design that captures solar heat without machines.

2.3 It produces no power at night or when cloudy.

3.1 B —electricity.

3.2 (a) Advantage: renewable, no CO₂, no fuel cost; disadvantage: intermittent or high upfront cost. (b) Store energy in batteries (or use a backup/grid) for use when the sun is not shining.

3.3 Active solar uses pumps/fans to move solar-heated water or air; passive solar uses building design (windows, materials) to capture heat with no machines.