AP ENVIRONMENTAL SCIENCE • EXERCISE SHEET

6.10 Geothermal Energy

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

Objective

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

You must be able to:

- describe **geothermal** 地热 energy from Earth's heat
- state advantages and disadvantages
- explain where it is most viable

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

Geothermal energy taps **Earth's internal heat**: hot water/steam from underground spins turbines to make electricity, or heats buildings directly.

Where it is viable

It is most practical near **plate boundaries and volcanic regions**, where heat is close to the surface (e.g. Iceland). Ground-source heat pumps work more widely for heating/cooling.

Advantages

- **Renewable**, reliable (works day and night), low CO_2.
- Small land footprint.

Disadvantages

- **Location-limited** —best only in geologically active areas.
- Can release some underground gases; high drilling cost.

A worked judgement

Iceland uses abundant geothermal energy because it sits on a plate boundary, but a geologically stable country has far less easily-accessible geothermal potential.

2 Practice

Now apply the methods above.

2.1 What is the source of geothermal energy? [1]

2.2 Where is geothermal energy most viable? [1]

2.3 State one advantage of geothermal power. [1]

3 Exam-style questions

3.1 Geothermal energy is limited mainly by [1]

- **A** the weather
- **B** its dependence on geologically active locations
- **C** the time of day
- **D** the season

3.2 A country on a plate boundary develops geothermal power.

(a) State two advantages. [2]

(b) Explain why a geologically stable country cannot easily use it. [2]

3.3 Explain why geothermal energy is more reliable than solar or wind. [2]

4 Go further

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

- work through the **6.10 Geothermal Energy** lesson on the **Learn** page;
- read the **Geothermal Energy** section of the AP Environmental Science handout on the **Know** page.

Solutions

2.1 Earth's internal heat.

2.2 Near plate boundaries / volcanic regions.

2.3 Any one: renewable, reliable, low CO_2, small footprint.

3.1 B —its dependence on geologically active locations.

3.2 (a) Any two: renewable, reliable (24/7), low-carbon, small land use. (b) In a stable area the heat is deep underground and hard/expensive to reach, so it is not practical.

3.3 Earth's heat is available constantly (day and night, all weather), unlike solar (needs sun) and wind (needs wind), so geothermal provides steady baseload power.