

Exercise walk-through

Global Wind Patterns ■ 4.5

eXercise

You must be able to

- explain **convection cells** 对流环流 (Hadley cells) and uneven heating
- link rising/sinking air to wet and dry regions
- describe the **Coriolis effect** 科里奥利效应

Method — Uneven heating drives circulation

The Sun heats the **equator** more than the poles. Warm air **rises** at the equator, cools, and **sinks** around 30° latitude, forming **convection (Hadley) cells**.

Method — Rising = wet, sinking = dry

- **Rising** air cools and drops rain → **wet** regions (tropical rainforests near the equator).
- **Sinking** air warms and dries → **dry** regions (deserts near 30° latitude).

Method — The Coriolis effect

Earth's rotation **deflects** moving air (and water): to the **right** in the Northern Hemisphere, to the **left** in the Southern. This curves winds into belts (trade winds, etc.).

Method — A worked link

Most major deserts sit near 30°N/S because that is where dry, sinking air suppresses rainfall.

Practice 2.1 ■ 1 mark

Where does warm air rise in the global circulation?

Solution 2.1

Method: Uneven heating drives circulation

Worked steps

At the equator **B1**.

Practice 2.2 ■ 1 mark

Does rising air create wet or dry conditions?

Solution 2.2

Worked steps

Wet **B1**.

Practice 2.3 ■ 1 mark

What causes the Coriolis effect?

Solution 2.3

Method: The Coriolis effect

Worked steps

Earth's rotation **B1**.

Exam-style 3.1 ■ 1 mark

Deserts commonly form near 30° latitude because air there is

A rising and wet

B sinking and dry

C stationary

D always cold

Solution 3.1

A rising and wet

B sinking and dry



C stationary

D always cold

Worked steps

B — sinking and dry.

Exam-style 3.2 ■ 2 marks

Air rises at the equator and sinks near 30° latitude.

- (a) State the climate (wet/dry) at the equator and at 30° .
- (b) Name this circulation pattern.

Solution 3.2

Method: Uneven heating drives circulation

Worked steps

(a) Equator: wet; 30° : dry **B1** **B1**. (b) A convection (Hadley) cell **B1**.

Exam-style 3.3 ■ 2 marks

Explain how uneven heating of Earth drives global wind patterns.

Solution 3.3

Method: Uneven heating drives circulation

Worked steps

The Sun heats the equator most; warm air rises there and sinks at higher latitudes, and Earth's rotation deflects the moving air, creating the global wind belts **M1** **A1**.