AP ENVIRONMENTAL SCIENCE • EXERCISE SHEET

# 4.9 El Nino and La Nina

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

## Objective

Build the skills to answer exam questions on **El Niño and La Niña**.

**You must be able to:**

- describe **El Niño** 厄尔尼诺 and **La Niña** 拉尼娜
- link them to changes in ocean temperature and weather
- explain effects on ecosystems and fisheries

## 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.

### The normal pattern

Normally, trade winds push warm surface water **west** across the Pacific, and cold, nutrient-rich water **upwells** off South America (supporting fisheries).

### El Niño

In **El Niño**, the trade winds weaken, so warm water spreads **east**. Upwelling is suppressed, so nutrients (and fish) decline off South America; global weather shifts (droughts and floods in different regions).

### La Niña

**La Niña** is the opposite —trade winds strengthen, warm water piles up in the **west**, and upwelling off South America is **stronger** (more nutrients).

### A worked effect

During El Niño, reduced upwelling means fewer nutrients, so plankton and fish populations crash off Peru, hurting the fishing industry.

## 2 Practice

Now apply the methods above.

**2.1** In El Niño, which way does warm water spread across the Pacific? [1]

**2.2** What happens to upwelling off South America during El Niño? [1]

**2.3** How is La Niña different from El Niño? [1]

## 3 Exam-style questions

**3.1** During El Niño, the fishing industry off South America suffers because [1]

- **A** upwelling and nutrients decrease
- **B** upwelling increases
- **C** the water freezes
- **D** trade winds strengthen

**3.2** An El Niño year begins.

(a) Describe what happens to the trade winds and warm water. [2]

(b) Explain the effect on plankton and fish off South America. [2]

**3.3** Explain why upwelling of cold water supports rich fisheries. [2]

## 4 Go further

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

- work through the **4.9 El Nino and La Nina** lesson on the **Learn** page;
- read the **El Nino and La Nina** section of the AP Environmental Science handout on the **Know** page.

## Solutions

**2.1** Eastward.

**2.2** It is suppressed (reduced).

**2.3** In La Niña the trade winds strengthen and upwelling off South America is stronger (the opposite of El Niño).

**3.1 A** —upwelling and nutrients decrease.

**3.2** (a) The trade winds weaken, so warm surface water spreads eastward across the Pacific. (b) Warm water suppresses the cold nutrient upwelling, so plankton decline and fish populations crash.

**3.3** Upwelling brings cold, nutrient-rich water to the surface, fueling plankton growth that supports fish and the whole food web.