

4.9 El Nino and La Nina

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

KEY WORDS el niño 厄尔尼诺 • la niña 拉尼娜

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]

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.