Rainfall and Patterns

How Pacific conditions shape the odds of rain

HS-ENV1-7 "Observe the difference between weather and climate. Observe how weather can be influenced by global climatic patterns, such as El Niño and La Niña. Use a model or simulation to observe the factors that influence weather and climate..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the details that describe weather and circle the details that describe climate. Number the steps that connect Pacific Ocean conditions to rainfall so you can trace how a climate pattern affects local weather.

A Rainy Day in Piura

1. At a school in Piura, Peru, students record a sudden afternoon downpour on Tuesday. That storm is weather: the conditions at a particular place and time. The town's climate describes patterns over many years, such as which months usually bring rain and how much falls in an average season. A single wet afternoon cannot establish a wetter climate. To compare climates, researchers examine records from many years, often 30 or more, rather than picking one dramatic storm. The same records also show that some rainy seasons differ sharply from what is typical.

2. Piura sits near the eastern tropical Pacific, where ocean conditions can change the odds of rain. During El Niño, weakened trade winds allow unusually warm surface water to spread eastward. Warmer water adds moisture to the air and can increase rainfall along the coast of northern Peru. During La Niña, stronger trade winds help keep that water cooler; rainfall there is often lower. Neither pattern guarantees the weather on a particular Tuesday. A local storm still depends on conditions such as moisture and rising air, while the ocean pattern shifts the chances across a season.

3. Imagine a computer model of Piura's coast with controls for ocean temperature, winds, Earth's rotation, and gravity. Gravity holds the atmosphere and ocean near Earth and helps denser, cooler air settle beneath warmer air. Uneven heating creates air movement; Earth's rotation deflects that movement, changing where winds carry moist air. In one run, the model shows the chance of rain tomorrow. In repeated runs covering many seasons, it estimates how often rainy seasons occur under warmer or cooler Pacific conditions. The model cannot predict every storm, but comparing its runs helps explain why climate patterns influence weather.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why is Tuesday's downpour a weather observation rather than evidence that Piura's climate has changed?

2. Trace how the trade winds and ocean water during El Niño can affect rainfall near Piura.

3. In the computer model, how do gravity and Earth's rotation each affect the movement of air?

4. What different information comes from the model's next-day run and its repeated runs across many seasons?

3 YOUR TURN

Your own words

Invent a coastal town on the eastern tropical Pacific. In four sentences, describe warm-water and cool-water model runs, give an invented next-day rain chance and a many-season rainy-season rate for each, and explain how Earth's rotation and gravity affect the model.

ANSWER KEY

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HIGH SCHOOL · HS-ENV1-7

PART 1 · READ AND MARK

Underline the details that describe weather and circle the details that describe climate. Number the steps that connect Pacific Ocean conditions to rainfall so you can trace how a climate pattern affects local weather. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why is Tuesday's downpour a weather observation rather than evidence that Piura's climate has changed?	**It describes one event at a specific time. A climate change would require evidence from records spanning many years.**
2	Trace how the trade winds and ocean water during El Niño can affect rainfall near Piura.	**Weaker trade winds allow warm surface water to spread eastward. That water adds moisture to the air and can increase rainfall near Piura.**
3	In the computer model, how do gravity and Earth's rotation each affect the movement of air?	**Gravity keeps air near Earth and helps denser, cooler air settle. Earth's rotation deflects moving air, affecting where winds carry moisture.**
4	What different information comes from the model's next-day run and its repeated runs across many seasons?	**The next-day run gives a chance of rain tomorrow. The repeated runs estimate how often rainy seasons occur under different Pacific conditions.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

In my invented town of Maris, the warm-water run gives a 60% chance of rain tomorrow and rainy seasons in 7 of 10 simulated years. The cool-water run gives a 20% chance tomorrow and rainy seasons in 2 of 10 simulated years. Earth's rotation deflects winds that carry moisture toward or away from Maris. Gravity keeps air near Earth and helps cooler, denser air settle beneath warmer air.

Accept plausible invented values rather than requiring the sample's numbers. Look for a clear distinction between next-day weather and many-season patterns, plus accurate roles for rotation and gravity.