

Climate Control Lab

Mission: Why is London warmer in winter than Indianapolis, even though it is farther north? Why is Quito cool even though it sits on the Equator? Control latitude, elevation, and oceans to discover what shapes climate.

Big question: What factors shape the climate of a place?

★ Warm-up: Weather vs. climate

Weather or climate?

"It is raining today." ✓ **Weather.**

"Indiana has cold winters." ✓ **Climate.**

Key vocabulary

Climate	The usual weather of a place over many years.
Elevation	Height above sea level.
Ocean current	A stream of warm or cold water in the ocean.
Gulf Stream	A warm current that flows from the Gulf of Mexico toward Europe.

1 Box 1

Latitude test

In the simulator: Try at least 6 different settings.

What happens to the average temperature as latitude increases?

☐ It decreases ☐ It increases ☐ It doesn't change

✓ **It decreases**

2 Box 2

Elevation: Quito

In the simulator: Test the Quito preset.

Quito is on the Equator. Why isn't it hot?

☐ Its high elevation makes it cooler ☐ It is near the ocean ☐ It has a cold current

✓ **Its high elevation makes it cooler**

3 Box 3

Oceans: London vs. Indianapolis

In the simulator: Test the London and Indianapolis presets.

What did you notice?

Record

Record the summer vs. winter gap for each city.

City	Gap (°F)
London (coast, warm current)	
Indianapolis (inland)	

4 Box 4

Find every zone

In the simulator: Create a Tropical, a Polar, and a Highland climate.

What did you notice?

5 Box 5

Explain a climate (CER)

Why are London's winters milder than Indianapolis's, even though London is farther north?

Claim

Look for: Names the ocean factor; at least 10 words

Evidence from the lab

Look for: a number from the simulator; at least 12 words

Reasoning

Look for: Explains how oceans affect temperature; at least 14 words

6 Box 6

Legend: design a city Legend only

Design a city with mild temperatures all year. What latitude, elevation, and ocean settings would you choose? Explain using your lab results.

Look for: a number from the simulator; at least 30 words



Exit ticket: answer the big question in your own words

What factors shape the climate of a place?

Look for: Climate depends on latitude (farther from the Equator is colder), elevation (higher is colder), distance from the ocean (oceans make winters milder and summers cooler), and ocean currents (the warm Gulf Stream keeps western Europe mild).



Completion codes

Students see a code like **ABC-I3** when they finish. The first part must match below. The letter is the level (E = Explorer, I = Investigator, L = Legend), and the number at the end is how many stars they earned.

Level	Code starts with
 Explorer	1GD-E
 Investigator	TKL-I

**Watch for these misconceptions**

- "Latitude and longitude are the same thing." Latitude = north/south position, longitude = east/west position.
- "Places at the same latitude have the same climate." Elevation, oceans, and currents matter too.
- "South America is directly south of North America." Most of South America is east of Florida.