Zoe's Fall Harvest Weather Mystery

Grade 6 science fall-harvest

Students will be able to distinguish between weather and climate, and explain how ocean currents and atmospheric patterns influence regional weather during seasonal changes.

Name: _____ Date: _____

1. Zoe arrives at the harvest festival on a crisp October morning. She notices the sky is clear and the air feels cool. Is Zoe observing WEATHER or CLIMATE? Circle your answer and explain in one sentence. WEATHER / CLIMATE

2. True or False: Climate tells us what the weather will be like tomorrow. Write TRUE or FALSE, then fix the false statement if you chose FALSE.

3. Zoe finds a rare find — an old farmer's journal hidden under the barn. It shows October temperatures for this valley going back 50 years. Is the journal a record of weather or climate data? Explain why using the word 'average.'

4. Zoe reads the journal and sees that warm, wet air from the nearby ocean arrives every autumn. This air keeps the valley harvest season mild. What ocean-atmosphere process is causing this pattern? Fill in the blank. The warm air moving from the ocean onto land is called a _____ wind, and it is driven by differences in _____ between the ocean and the land.

5. Zoe notices the harvest valley gets much more rain in October than the desert region just 200 km east. Both places are at the same latitude. Identify ONE reason the valley gets more rain. Use the words 'ocean current' or 'prevailing wind' in your answer.

6. Zoe discovers a hidden treasure — a set of climate graphs showing that her valley's average October temperature has risen 1.2°C over the last 40 years. Meanwhile, three unusually cold October days were recorded last year. Zoe's classmate says: 'Those cold days prove the climate is not warming.' Is the classmate correct? Explain the difference between a weather event and a climate trend in your answer.

7. Zoe examines a unique item in the journal — a hand-drawn map showing a warm ocean current flowing along the valley's coastline. In autumn, this current weakens every few years, causing cooler, drier harvest seasons. Name the global climate pattern that involves weakening Pacific Ocean currents and cooler sea-surface temperatures. Then explain ONE effect this pattern would have on Zoe's valley harvest season.

8. Zoe has completed her harvest-day investigation. She wants to share her findings with the school science fair. Using evidence from all her observations — the farmer's journal, the climate graphs, the ocean current map, and today's weather — write a short scientific conclusion (3–4 sentences). Your conclusion must: (1) state the difference between weather and climate, (2) explain how ocean currents shape the valley's autumn climate, and (3) describe what could happen to future harvests if ocean surface temperatures keep rising. This is Zoe's final discovery — make it count.

Answer Key: Zoe's Fall Harvest Weather Mystery

GRADE 6 | TEACHER & PARENT USE ONLY

Before Q6, display a real NOAA climate map of your region. Ask students to compare October average temperatures to the harvest-day readings Zoe recorded in the worksheet — this makes the weather-vs-climate distinction concrete and personal.

1. Zoe arrives at the harvest festival on a crisp October morning. She notices the sky is clear and the air feels cool. Is Zoe observing WEATHER or CLIMATE? Circle your answer and explain in one sentence. WEATHER / CLIMATE

Answer: Q1: Weather is the condition of the atmosphere at one specific time and place. Zoe is looking at what the sky and air feel like right now — that is weather, not climate. ANSWER: WEATHER. Explanation example: 'Weather is what the atmosphere is doing today, not the long-term pattern.'

2. True or False: Climate tells us what the weather will be like tomorrow. Write TRUE or FALSE, then fix the false statement if you chose FALSE.

Answer: Q2: Climate is the average pattern of weather over 30 or more years for a region. It does NOT tell us tomorrow's exact weather — that is a weather forecast. ANSWER: FALSE. Corrected statement: 'Climate tells us the average weather patterns over many years, not tomorrow's weather.'

3. Zoe finds a rare find — an old farmer's journal hidden under the barn. It shows October temperatures for this valley going back 50 years. Is the journal a record of weather or climate data? Explain why using the word 'average.'

Answer: Q3: Data collected over 50 years shows long-term patterns, not just one day's conditions. Long-term patterns of temperature, precipitation, and wind make up climate. ANSWER: The journal is a CLIMATE record because it shows the average October temperatures over 50 years, revealing a long-term pattern rather than a single weather event.

4. Zoe reads the journal and sees that warm, wet air from the nearby ocean arrives every autumn. This air keeps the valley harvest season mild. What ocean-atmosphere process is causing this pattern? Fill in the blank. The warm air moving from the ocean onto land is called a _____ wind, and it is driven by differences in _____ between the ocean and the land.

Answer: Q4: When ocean water stays warmer than land in autumn, it heats the air above it. That warm air rises and cooler land air moves in — but warm ocean air also flows inland. This is an onshore/sea breeze pattern driven by temperature differences. ANSWER: The warm air moving from the ocean onto land is called a SEA (or onshore) wind, and it is driven by differences in TEMPERATURE between the ocean and the land.

5. Zoe notices the harvest valley gets much more rain in October than the desert region just 200 km east. Both places are at the same latitude. Identify ONE reason the valley gets more rain. Use the words 'ocean current' or 'prevailing wind' in your answer.

Answer: Q5: Being at the same latitude means both places receive similar solar energy. The difference in rainfall is caused by how moisture reaches each place. Prevailing winds carry moist ocean air westward over the valley. Mountains or distance block that moisture before it reaches the desert. ANSWER: The valley receives more October rain because prevailing winds carry moist air from the ocean across the valley. The desert lies in a rain shadow or is too far inland for that moisture to reach.

6. Zoe discovers a hidden treasure — a set of climate graphs showing that her valley's average October temperature has risen 1.2°C over the last 40 years. Meanwhile, three unusually cold October days were recorded last year. Zoe's classmate says: 'Those cold days prove the climate is not warming.' Is the classmate correct? Explain the difference between a weather event and a climate trend in your answer.

Answer: Q6: Three cold days are short-term weather events — they represent local, brief conditions. Climate trend is calculated from decades of data across a large region. A few cold days do not cancel a 40-year warming trend. ANSWER: The classmate is INCORRECT. Three cold October days are weather events — short-term conditions that vary from day to day. The 1.2°C rise over 40 years is a climate trend based on long-term averages. Weather events can go against a climate trend without disproving it.

7. Zoe examines a unique item in the journal — a hand-drawn map showing a warm ocean current flowing along the valley's coastline. In autumn, this current weakens every few years, causing cooler, drier harvest seasons. Name the global climate pattern that involves weakening Pacific Ocean currents and cooler sea-surface temperatures. Then explain ONE effect this pattern would have on Zoe's valley harvest season.

Answer: Q7: When the warm Pacific current weakens and sea-surface temperatures cool in the central and eastern Pacific, this is called La Niña. La Niña shifts atmospheric circulation, often bringing drier and cooler conditions to certain regions. ANSWER: The pattern is called LA NIÑA. One effect on Zoe's valley: cooler sea-surface temperatures reduce the amount of warm, moist air moving onshore. This leads to a drier and cooler autumn harvest season, which could reduce crop growth or cause an early frost.

8. Zoe has completed her harvest-day investigation. She wants to share her findings with the school science fair. Using evidence from all her observations — the farmer's journal, the climate graphs, the ocean current map, and today's weather — write a short scientific conclusion (3–4 sentences). Your conclusion must: (1) state the difference between weather and climate, (2) explain how ocean currents shape the valley's autumn climate, and (3) describe what could happen to future harvests if ocean surface temperatures keep rising. This is Zoe's final discovery — make it count.

Answer: Q8: A strong conclusion connects all three strands of evidence and applies them to a future prediction. ANSWER EXAMPLE: 'Weather describes the daily conditions Zoe observed at the harvest festival, while climate describes the long-term patterns recorded in the 50-year journal. Zoe's valley has a mild, moist autumn climate because warm ocean currents drive moisture-laden prevailing winds onshore each fall. The climate graphs show a 1.2°C warming trend over 40 years, linked to rising ocean surface temperatures. If ocean temperatures continue to rise, atmospheric circulation patterns may shift — bringing more extreme weather events, altered rainfall, and unpredictable harvest seasons to Zoe's valley in the future.'