Reading the Air

Use context to interpret scientific measurements, symbols, and technical terms.

CCSS.ELA-Literacy.RST.9-10.4 "Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each scientific term or symbol that helps explain the investigation. Circle the nearby words that reveal what each term or symbol means or does.

Greenhouse Carbon Dioxide Investigation

1 At a school greenhouse, students tested whether opening roof vents changed carbon dioxide levels near tomato plants. They placed a sensor at leaf height and recorded the air's carbon dioxide concentration in ppm, or parts per million, every five minutes. A reading of 420 ppm means that, in one million units of sampled air, about 420 units are carbon dioxide. This number describes concentration, not the amount of gas moving through the greenhouse. To study movement, the team would need information about airflow, area, and time.

2 Next, the class calculated ΔCO_2, read "change in carbon dioxide," by subtracting an earlier concentration from a later one. During a closed-vent trial, the sensor rose from 415 ppm to 460 ppm, so ΔCO_2 was +45 ppm. The plus sign shows an increase between the two readings. In a comparison trial, the vents remained open. Keeping this condition different created an experimental variable, while using the same sensor height and five-minute interval helped control other conditions. These choices let students compare concentration changes fairly across trials.

3 Before collecting data, students calibrated the sensor by checking its reading against a known reference gas. Calibration does not prove that greenhouse carbon dioxide stayed constant. It checks whether the instrument reports a dependable value. The group also chose a baseline, the first concentration recorded before any vent was moved. Later readings could be compared with that starting point. If the concentration dropped from the baseline after vents opened, students could describe a decrease in local air concentration. They still could not claim a carbon dioxide flux unless they measured how much air crossed a defined area during a stated time.

2 ANSWER WITH EVIDENCE

Use the passage

1. In this investigation, what does ppm measure, and what does it not measure?

2. What does ΔCO_2 mean, and what does the plus sign in +45 ppm show?

3. What is the experimental variable in the comparison trials? Use details from the passage to explain your answer.

4. Why could the students describe a decrease in concentration but not claim they had measured carbon dioxide flux?

3 YOUR TURN

Your own words

Write three sentences about a sensor investigation of your choice. Use one scientific symbol or abbreviation and two domain-specific terms, and include context clues that make each meaning clear.

Reading the Air

PART 1 · READ AND MARK

Underline each scientific term or symbol that helps explain the investigation. Circle the nearby words that reveal what each term or symbol means or does. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	In this investigation, what does ppm measure, and what does it not measure?	**Ppm measures carbon dioxide concentration in sampled air. It does not measure the amount of carbon dioxide moving through the greenhouse.**
2	What does ΔCO_2 mean, and what does the plus sign in +45 ppm show?	**ΔCO_2 means change in carbon dioxide concentration. The plus sign shows that the concentration increased by 45 ppm.**
3	What is the experimental variable in the comparison trials? Use details from the passage to explain your answer.	**The vent condition is the experimental variable because the vents were closed in one trial and open in the comparison trial.**
4	Why could the students describe a decrease in concentration but not claim they had measured carbon dioxide flux?	**They had concentration readings, but flux would also require measurements of airflow, a defined area, and time.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

In a water-quality test, the team recorded pH 6.2, using pH as a scale that indicates acidity or basicity. They added a buffer, a substance that resists sudden pH changes, before repeating the measurement. Their control sample, which received no added pollutant, supplied a condition for comparison.

Accept accurate paraphrases when students use passage context to distinguish concentration from flux. For the open task, accept varied investigations if the symbol or abbreviation and both technical terms have clear, accurate context clues.