Carbon in the Air

Read and compare fossil-fuel emissions and atmospheric data.

E.7.9B.2 "Interpret data about the relationship between the release of carbon dioxide from burning fossil fuels into the atmosphere and the presence of greenhouse gases."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the sentence that explains how burning fossil fuels adds CO_2 to the air, then draw an upward arrow beside each table row where both values rose from the previous row.

What Happens After the Fuel Burns?

1. On a cold morning, a power plant may burn coal to make electricity for nearby homes. Coal, oil, and natural gas are fossil fuels. When they burn, carbon in the fuel joins oxygen and becomes carbon dioxide (CO_2), a gas released into the air. CO_2 traps some heat in Earth's atmosphere, so it is a greenhouse gas.

2. The table compares worldwide fossil-fuel CO_2 released during each listed year with the amount of CO_2 measured in the air that year. Emissions are in billions of metric tons per year. Air measurements use parts per million (ppm): a value of 400 ppm means about 400 of every million air molecules are CO_2 molecules. The figures are rounded.

WORLDWIDE FOSSIL-FUEL EMISSIONS AND ATMOSPHERIC CO_2, ROUNDED

Year	Fossil-fuel CO_2 released (billion metric tons)	CO_2 in air (ppm)
1960	9	317
1980	19	339
2000	25	370
2010	33	390

3. Air does not lose all its CO_2 when a year ends. Oceans and plants take in some CO_2, while other sources also release it. That means one year's emissions and the amount in the air are related but are not the same measurement. Methane and water vapor are greenhouse gases too, but this table measures only CO_2.

2 ANSWER WITH EVIDENCE

Use the passage

1. From 1960 to 1980, how did fossil-fuel CO_2 emissions and CO_2 in the air change?

2. Compare both measurements in 2000 and 2010. What pattern do you see?

3. Which pair of neighboring rows shows the greatest rise in atmospheric CO_2? How many ppm did it rise?

4. Did every rise in annual fossil-fuel emissions go with the same-sized rise in atmospheric CO_2? Compare two pairs of neighboring rows.

3 YOUR TURN

Your own words

Imagine a new table row for 2030: annual fossil-fuel CO_2 emissions are 38 billion metric tons, and atmospheric CO_2 is 410 ppm. In two or three sentences, compare this row with 2010, explain what relationship it supports, and name one thing these two rows cannot prove.

ANSWER KEY

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GRADE 7 · E.7.9B.2

PART 1 · READ AND MARK

Underline the sentence that explains how burning fossil fuels adds CO_2 to the air, then draw an upward arrow beside each table row where both values rose from the previous row. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	From 1960 to 1980, how did fossil-fuel CO_2 emissions and CO_2 in the air change?	**Annual emissions rose by 10 billion metric tons, and atmospheric CO_2 rose by 22 ppm.**
2	Compare both measurements in 2000 and 2010. What pattern do you see?	**Annual emissions rose from 25 to 33 billion metric tons, while atmospheric CO_2 rose from 370 to 390 ppm. Both increased.**
3	Which pair of neighboring rows shows the greatest rise in atmospheric CO_2? How many ppm did it rise?	**From 1980 to 2000, atmospheric CO_2 rose by 31 ppm.**
4	Did every rise in annual fossil-fuel emissions go with the same-sized rise in atmospheric CO_2? Compare two pairs of neighboring rows.	**No. From 1960 to 1980, atmospheric CO_2 rose 22 ppm; from 1980 to 2000, it rose 31 ppm. Annual emissions rose in both spans.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Compared with 2010, the imagined 2030 row has 5 billion more metric tons of annual fossil-fuel CO_2 emissions and 20 more ppm of atmospheric CO_2. Both measurements increased, which supports a relationship between fossil-fuel emissions and CO_2 in the air. These two rows alone cannot prove that fossil-fuel burning caused the entire increase in atmospheric CO_2.

Accept equivalent comparisons with correct units. For the open task, the student should identify a limit of the two-row comparison rather than claim it proves the cause of the entire atmospheric increase.