PASSAGE I

Researchers have noticed sudden decay in limestone grave markers in a cemetery downwind from a coal-burning power plant. Two studies were conducted to examine this decay process.

Study 1

A key mineral component of limestone is *feldspar*, which is also abundant in ground soil. Feldspar, as it weathers and decays, breaks down into another mineral, *kaolinite*. The weathering process is often expedited by moisture from rain and humidity. Researchers measured the levels of feldspar and kaolinite in the soil of the cemetery and other locations at specific distances from the cemetery before and after rain showers. The results are shown in Table 1. (Note: The soil sample sizes were the same for each location tested.)

Study 2

The researchers believe that the emissions from the nearby power plant are somehow affecting the decay of the limestone. Levels of common gases – carbon dioxide (CO_2), oxygen (O_2), nitrogen dioxide (NO_2), and sulfur (S) – in the atmosphere were tested at the cemetery and other locations at specific distances from both the cemetery and the power plant. Measurements in parts per million (ppm) were recorded in Table 2.

Table 1

	Before rain		After rain	
Distance from cemetery (m)	Amount of feldspar in the soil (g/ft^3)	Amount of kaolinite soil (g/ft^3)	Amount of feldspar in the soil (g/ft^3)	Amount of kaolinite in the soil (g/ft^3)
0	26.3	13.7	25.2	14.6
125	29.1	12.9	28.5	13.7
225	29.9	12.4	29.6	12.6
325	30.8	12.1	30.7	12.2
425	32.4	11.5	32.3	11.6

Table 2

Distance from power plant (m)	Distance from cemetery (m)	CO_2 levels (ppm)	O_2 levels (ppm)	NO_2 levels (ppm)	S levels (ppm)
0	125	7	3	13	26
100	225	8	5	10	22
200	325	10	12	9	17
300	425	11	14	5	10
400	525	13	17	3	5

1. Which of the following factors was varied in Study 1?
   A. Distance from power plant
   B. Size of soil sample
   C. Distance from cemetery
   D. Common gas levels

2. Carbon monoxide is another gaseous byproduct associated with coal-burning power plants. If carbon monoxide levels behave like the sulfur gas levels in Study 2, one would expect that carbon monoxide levels:
   F. would increase as distance from power plant increases.
   G. would be higher when O_2 levels are higher.
   H. would decrease as distance from power plant increases.
   J. would be lower when NO_2 levels are higher.

3. According to Study 1, *kaolinite* levels are highest at what distance from the cemetery?
   A. >400 meters
   B. Between 200 and 400 meters
   C. Between 100 and 300 meters
   D. <100 meters

4. According to the results of Study 2, as distance from the power plant decreases:
   F. sulfur levels decrease.
   G. sulfur and NO_2 levels increase.
   H. NO_2 and O_2 levels decrease.
   J. CO_2 and O_2 levels increase.

5. According to the results of Study 1, as distance from the cemetery increases, feldspar decay:
   A. increases only.
   B. is not affected.
   C. is reversed.
   D. decreases only.