

Rain's Long Reach

Trace how air pollution can affect Germany's land, water, and buildings.

SS6G8.a "Explain the causes and effects of acid rain in Germany."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline three causes of acid rain or acid-rain damage, and circle the effect that follows each cause. Write the same number beside each underlined cause and its linked circled effect, so your numbers show three cause-and-effect chains.

Acid Rain in Germany

- ① Acid rain begins with air pollution, not with rain that is naturally acidic. In Germany, power plants, factories, home heating, and vehicles have burned coal, oil, gasoline, or diesel fuel. Burning these fuels releases sulfur dioxide and nitrogen oxides into the air. Winds can carry the gases across Germany or from nearby countries. High in the atmosphere, the gases mix with water vapor and oxygen. They form acidic compounds that return to Earth in rain, snow, fog, or dry particles.
- ② When acidic precipitation falls on German forests, it can wash important nutrients from soil and make aluminum in the soil easier for roots to take in. This can weaken trees and make them less able to handle cold, drought, insects, or disease. Acid rain also enters lakes and streams. More acidic water can harm fish, insects, and other living things. In cities, acidic moisture can slowly wear away limestone, sandstone, metal, and paint on buildings, statues, bridges, and other structures.
- ③ Germany and other European countries have worked to reduce the pollution that causes acid rain. For example, power plants can use cleaner energy sources or equipment that removes sulfur dioxide from smokestacks. Cars and trucks can use pollution-control devices and cleaner fuels. These changes lower the amount of sulfur dioxide and nitrogen oxides released into the air. Reducing pollution helps protect forests, waterways, and historic buildings. Because winds move pollution, countries also cooperate by making agreements to cut harmful emissions.

2 ANSWER WITH EVIDENCE Use the passage

1 What two air pollutants are released when fuels are burned?

2 How do air pollutants become part of acid rain?

3 Describe two effects acid rain can have on Germany's natural environment.

4 Why do Germany and nearby countries need to cooperate to reduce acid rain?

3 YOUR TURN Your own words

Write a three-sentence cause-and-effect action plan for one pollution source in Germany. Name the source and pollutant, explain one likely effect of acid rain, and state an action that would reduce the damage.

PART 1 • READ AND MARK

Underline three causes of acid rain or acid-rain damage, and circle the effect that follows each cause. Write the same number beside each underlined cause and its linked circled effect, so your numbers show three cause-and-effect chains. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What two air pollutants are released when fuels are burned?	Sulfur dioxide and nitrogen oxides.
2	How do air pollutants become part of acid rain?	High in the atmosphere, sulfur dioxide and nitrogen oxides mix with water vapor and oxygen. They form acidic compounds that return in precipitation or dry particles.
3	Describe two effects acid rain can have on Germany's natural environment.	It can wash nutrients from forest soil and weaken trees. It can also make lakes and streams more acidic, harming fish, insects, and other living things.
4	Why do Germany and nearby countries need to cooperate to reduce acid rain?	Winds can carry the gases that cause acid rain across Germany and from nearby countries, so pollution released in one country can affect another.

PART 3 • YOUR TURN (SAMPLE ANSWER)

A coal-burning power plant releases sulfur dioxide into the air. The pollutant can help form acid rain that harms fish in a German stream. Installing equipment that removes sulfur dioxide from smokestacks would reduce this damage.

Accept equivalent cause-and-effect explanations that accurately connect fuel burning, sulfur dioxide or nitrogen oxides, acidic precipitation, and environmental or building damage. For Part 3, accept a logical pollution-reduction action that matches the named source and effect.