Air After Dismissal

Trace pollutants from a source to a health effect and a solution.

ENV.4.1 "Identify human impact and develop a solution for protection of the atmosphere, considering pollutants (e.g., acid rain, air pollution, smog, ozone layer..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline sources of air pollutants and circle health effects. Mark each action that protects lungs with E if it cuts emissions or X if it reduces exposure.

The Air Outside Jefferson High

1 At 3 p.m., buses and cars crowd the road beside Jefferson High School. Diesel exhaust contains fine particles, tiny bits of matter that can reach deep into the lungs. Vehicle exhaust also releases nitrogen oxides, which react with other chemicals in sunlight to form ground-level ozone. Ozone is not released straight from a tailpipe. It forms in the air, sometimes far from the road. Breathing either fine particles or ground-level ozone can irritate airways and trigger asthma attacks. Repeated exposure to these pollutants can also worsen chronic obstructive pulmonary disease, or COPD, which makes breathing difficult.

2 A student group counts 22 diesel buses leaving campus each afternoon. Some wait with engines running for several minutes before departure. The group proposes replacing older diesel buses with electric buses as the fleet is retired. Electric buses have no tailpipe emissions, so this change would cut fine particles and nitrogen oxides from buses near the school. It would not erase pollution from nearby cars or from power plants that supply electricity. Because ozone forms through chemical reactions across a wider area, cleaner school buses alone cannot guarantee low ozone levels every afternoon.

3 The group also asks the district to track two measures at the school: fine particles during dismissal and ozone on sunny afternoons. A nearby monitoring station can report ozone, while a portable sensor can show changes in particle levels near the bus lane. The students would compare readings before and after the bus replacement, using similar weather and traffic conditions when possible. On days with high pollution, the school could move strenuous outdoor practices indoors to reduce students' exposure. This step protects lungs during a bad-air day, but unlike cleaner buses, it does not reduce the pollution itself.

2 ANSWER WITH EVIDENCE

Use the passage

1. How does vehicle exhaust contribute to fine particles and ground-level ozone in different ways?

2. Why might polluted air near the school be especially harmful to a student with asthma or a person with COPD?

3. Which pollutants would replacing diesel buses with electric buses reduce near the school? Why might ozone still be a problem?

4. How does moving outdoor practices indoors protect students differently from replacing diesel buses?

3 YOUR TURN

Your own words

At a weekend street fair, food trucks use diesel generators beside a play area. Write one paragraph proposing two practical actions, explaining how each changes emissions or exposure, naming a pollutant and a health effect, and describing one way to check whether your plan worked.

ANSWER KEY

Air After Dismissal

HIGH SCHOOL · ENV.4.1

PART 1 · READ AND MARK

Underline sources of air pollutants and circle health effects. Mark each action that protects lungs with E if it cuts emissions or X if it reduces exposure. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How does vehicle exhaust contribute to fine particles and ground-level ozone in different ways?	**Diesel exhaust releases fine particles directly. Vehicle exhaust releases nitrogen oxides, which react with other chemicals in sunlight to form ground-level ozone.**
2	Why might polluted air near the school be especially harmful to a student with asthma or a person with COPD?	**Fine particles and ground-level ozone can irritate airways and trigger asthma attacks. Repeated exposure can worsen COPD.**
3	Which pollutants would replacing diesel buses with electric buses reduce near the school? Why might ozone still be a problem?	**The replacement would reduce fine particles and nitrogen oxides from bus tailpipes. Other sources remain, and ozone can form across a wider area.**
4	How does moving outdoor practices indoors protect students differently from replacing diesel buses?	**Moving practices indoors reduces students' exposure on high-pollution days. Replacing diesel buses reduces tailpipe emissions.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Vendors could plug into electrical hookups instead of running diesel generators beside the play area. This would reduce fine particles released nearby. Organizers could also ban idling delivery trucks near children, cutting another source of fine particles. Lower particle exposure could reduce the chance of an asthma attack for a visitor with asthma. Volunteers could compare particle readings near the play area at similar times before and after the changes.

Accept other practical actions when the student accurately connects each to reduced emissions or exposure. A proposed check should measure a relevant pollutant or compare exposure under reasonably similar conditions.