

Exercise 2B

From: Pathfinders for Kids — The Respiratory System
http://infozone.imcpl.org/kids_resp.htm

NO MORE OZONE/THE RAIN GAME

OVERVIEW

The effect of weather on air quality is difficult for students to conceptualize. This activity encourages an understanding of how weather can both help form and dilute air pollution.

BACKGROUND INFORMATION

In the summertime, the Clean Air Coalition of Southeast Michigan calls Ozone Action! days to encourage people to reduce the amount of pollutants in the air. That is because hot, sunny days help turn pollutants into ozone – a lung irritant when excessive amounts are inhaled. Southeast Michigan never has Ozone Action! days when it rains, because rain helps to get rid of ground-level ozone.

PROCEDURE

Outside, or in a room with plenty of space, have the students line up and count off one through six. Tell all the students in group one they are pollution from factories, blowing in the wind. Tell group two they are people driving cars. Students in group three are the pollutants escaping from the cars (they will have to stay close, at first, before moving with the wind) and students in group four are people mowing lawns. Students in group five are pollutants from the lawn mowers and group six represents light and heat from the sun.

Target Grade Level

4th-5th Grade

TIME

One class period.

MATERIALS

- assorted colored construction paper
- rope or hula hoop

OBJECTIVES

After participating in this hands-on activity that simulates the processes of ozone formation and precipitation the students will be able to:

- explain how weather influences ground-level ozone formation and depletion
- explain the precipitation process

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PROCEDURE CONTINUED

Tell the students to imagine that the world is still asleep and that, as the sun rises (group six should “rise and shine”) the people start to wake up too. Some people drive to a factory (polluting); the factory starts to work (polluting). Other people start to mow their lawns and the pollutants start to mingle together. Later in the morning, the sun is higher in the sky and shining everywhere and lots of people are driving around and the pollution from driving is mingling with the other pollution. At lunch time, the sun is at the highest point in the sky it can be and people take breaks for lunch. The factories stop working, the people mowing lawns go inside to eat and the people driving get out of their cars and go eat lunch, too. All the students who stopped the simulation should sit together, in a group, and watch what happens next, while pollution, that is still moving in the air, begins its transformation.

Imagining that they are transforming the others, students from group six (sunshine) should gently tap the pollutants on their arms while the others sit and watch. When the “pollutants” feel the sun tap them on the arm, they are to join hands with the sun, or each other as the group gets larger. In the end, the students have formed a giant mass of ozone.

Explain to the students that pollution and sunlight, together, create ozone; they are now a “plume” of ozone, staying at ground level, in the air we breathe. The ozone plume should move slowly toward the group of “polluters,” and sit down with them. When all students are sitting, explain the difference between ozone in the stratosphere (protects us from ultraviolet radiation) and ozone in the troposphere (a lung irritant). Explain that there are a lot of things being done to decrease the pollution that causes ground-level ozone and one of them is Ozone Alert!, a program that encourages people to reduce pollution on days when weather conditions make ozone formation more likely.

Ask students to talk about what their families do, or can do, to reduce the

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Explain that weather, while it helps to make ozone, can also help get rid of it. One weather condition that is really helpful is rain. Give each student a piece of construction paper and have them tape each piece in a random pattern on the ground.

Instruct each student to stand on top of their piece of construction paper with their arms outstretched. Tell them they are going to pretend they are a small cloud drop being blown about by the wind. When you say “go,” have the students move from their piece of paper to another of the same color, keeping their arms spread out to their sides.

Each time one student touches another, they should grab hands as if they were becoming a larger cloud drop and continue moving on to a piece of paper which has the same color as the one from which they came. If students from two different colors should happen to collide en route, they should combine and move to the closest piece of colored paper. This will be the group’s new color. Larger drops move about intermixed with smaller drops and keep combining in a similar manner. When a drop has five students in it, they have formed a raindrop and they should go to the puddle area and sit down. The puddle area is defined by a roped off area or hula hoop, located out of bounds. If drops combine to make a single drop of six or more, students then should divide it in half, choose new colors, and remain moving throughout the cloud.

Continue this game until the cloud is rained out and the puddle is full. Tell the students that the rain destroyed all of the bad ozone and that the air is clean, washed, as it were, by the rain. Ask them to discuss what they learned about how weather helps ozone form and how it also helps destroy ozone. Remind them that there is a lot they can do, on Ozone Alert! days, or every day, to reduce ozone-forming pollution.

EXTENSION:

Have the students draw pictures about weather’s role in ozone formation and depletion. Choose some and have the class, as a whole, write an essay about the events in the picture.