

Ozone and Weather

Objective:

To explore the conceptual relationships between weather parameters and ozone concentration, and to investigate these relationships using historical data.

Background:

Air pollution is a significant health hazard in major cities and industrialized areas across the world. Ozone is one of the most dangerous pollutants. Ozone near the earth surface is dangerous to living things and can damage man-made objects, while ozone high in the stratosphere is helpful (by blocking ultraviolet radiation). Ground-level ozone is formed by chemical reactions of nitrogen oxides with volatile organic compounds (VOC's) in sunlight. It results from industrial activity and automobile exhaust. Ground-level ozone is dangerous because it damages the lungs, making breathing difficult. In the United States, the Environmental Protection Agency (EPA) monitors ozone levels and issues an Air Quality Index (AQI) to keep the public informed of current ozone pollution levels. In this activity, you will be researching AQI levels and weather patterns to discover relationships between ozone and weather.

The table below contains the EPA's Air Quality Index for ozone. The index is based on the concentration of ozone near the surface. In the activity, you will be using the AQI levels described in the table below. In recording your data, you should record an approximate AQI value for each time period. For example, when the AQI progresses from Good for two hours to Moderate for four hours to Unhealthy for Sensitive Groups for one hour, the values that you record should reflect those changes. Appropriate values for this example could be 35, 45, 55, 65, 80, 95, 105. This shows a relatively smooth increase in ozone conditions over the described time period.