



## **Satellites, Weather and Climate**

### **Lesson plan summary: The Effects of Ozone**

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Grade Level: 9

Curriculum Target Benchmarks: S 7.4.3, S18.4.3

Subject keywords: ozone, atmosphere

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### **INTRODUCTION**

The topic of the atmosphere is a routine one in any earth science class. Rather than simply have students memorize the layers of the atmosphere, I wanted to make this topic a little more relevant to them, since air quality affects all of us in some way or another. This activity is an effort to help the students create a personal connection to the atmosphere, and more specifically to the changing ozone levels.

The topic of Ozone was chosen because the students are familiar with the word, however they don't know much about it. Ozone is interesting in that, depending on its location, it can be beneficial or detrimental to living things. Naturally occurring ozone is found in the stratosphere and filters out ultraviolet radiation from the sun. This is the "good" ozone. The "bad" ozone is found at ground level in the troposphere. Most of it is caused by the sun's energy reacting with chemicals that have been put into the air by man. The major sources of these chemicals are factory emissions and exhaust from motor vehicles. Both the good and the bad levels of ozone fluctuate.

In this Ozone project, students worked in small groups to research a topic of their choice concerning ozone and to present their finding to the class. The beauty of the project was that all of the research questions were different. Consequently, the students were shown a variety of presentations focusing on issues associated with ozone. The first, and most difficult, step was to come up with a specific research question. They had been given a brief overview on ozone, so they knew some basic facts, but they needed to research a bit more to help guide them to an area that most interested them. The first choice was to decide whether to concentrate on good ozone or bad ozone. From there, students had to find some of the issues that were associated with that type of ozone and focus on one of those issues. Initially the research topics were very broad, so students were asked to probe a little deeper into the topic to create a more specific research question. Taking time with this step was very important because a focused research question will simplify the research process. Some examples of research questions were "What effect does the ozone hole have on the Antarctic food web?", "How does smog affect plants?" and "Is there a link between bad ozone and asthma?".

Once the research question received approval, students were free to research their topic. The computer lab was reserved for this to enable each student to have access to a computer. We discuss the fact that delegation and communication skills are required for this part of the project as the students gather and organize their facts, search for images and create citations.

Students had the option of presenting their research in any format. The products included Powerpoint, Weebly, Prezi, and Microsoft Word with embedded images. This created some interesting variation for the audience. Overall, I believe the project raised the students' awareness of the benefits of good, stratospheric ozone and the harmful effects of bad, ground level ozone.



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