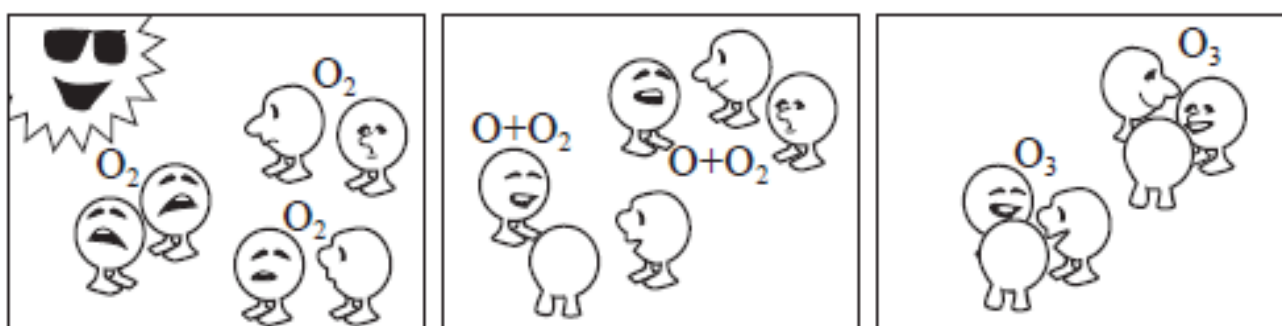


The atmosphere is an ocean of air and a precious natural resource for sustaining life on the Earth. Unfortunately, human activities based on national/personal interests are causing harm to this common resource, notably by depleting the fragile ozone layer, which acts as a protective shield for life on the Earth.

Ozone molecules consist of three oxygen atoms, as opposed to oxygen molecules, which consist of two oxygen atoms. Ozone molecules are exceedingly rare: fewer than 10 in every million molecules of air. However, for nearly a billion years, their presence in the atmosphere has played a vital role in safeguarding life on Earth. Depending on where it is located, ozone can either protect or harm life on Earth. The ozone in the troposphere (up to 10 kilometres above the Earth's surface) is "bad" ozone, which can damage lung tissues and plants. But about 90 percent of ozone found in the stratosphere (between 10 and 40 kilometres above the Earth's surface) is "good" ozone, which plays a beneficial role by absorbing dangerous ultraviolet (UV-B) radiation from the Sun.

Without this beneficial ozone layer, humans would be more susceptible to certain diseases due to the increased incidence of ultraviolet rays from the Sun. In the last decades the amount of ozone has decreased. In 1974 it was hypothesized that chlorofluorocarbons (CFCs) could be a cause for this. Until 1987, scientific assessment of the cause-effect relationship was not convincing enough to implicate CFCs. However, in September 1987, diplomats from around the world met in Montreal (Canada) and agreed to set sharp limits on the use of CFCs.

The way ozone is formed is illustrated in the following comic strip.

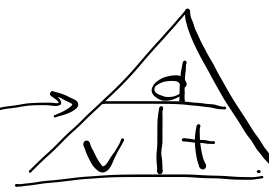


Suppose you have an uncle who tries to understand the meaning of this strip. However, he did not get any science education at school, and he doesn't understand what the author of the strip is explaining. He knows that there are no little fellows in the atmosphere, but he wonders what those little fellows in the strip stand for, what those strange notations O, O<sub>2</sub>, and O<sub>3</sub> mean, and which processes the strip represents. He asks you to explain the strip. Assume that your uncle knows:

- that O is the symbol for oxygen
- what atoms and molecules are

# Physics Topics

- Significant Figures
- Speed calculations
- Acceleration calculations
- Distance-time graphs (finding speed)



$$a = \frac{v_2 - v_1}{\Delta t}$$

$$v_2 = v_1 + at$$

Slope