CONCEPTUAL Physics

Ozone (O_3) shields us from most of the Sun's harmful UV, and is present in the atmosphere at an average concentration of only 0.3 parts per million. Although Earth's atmosphere extends upward for about 250 km, if it were squeezed down to the density and pressure it normally has at sea level, it would be only 8 km thick. Interestingly, the thickness of compressed atmospheric ozone would then be

a) less than 1 mm.

b) between 1 mm and 1 cm.

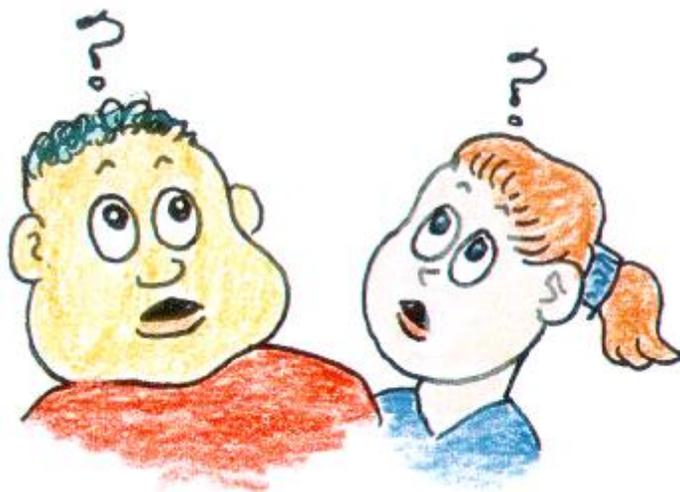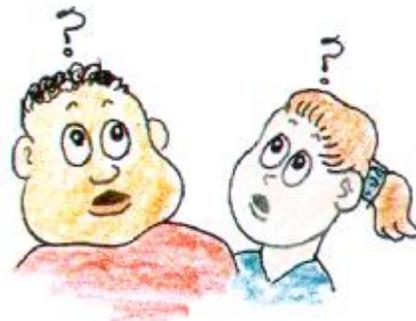c) between 1 cm and 1 m.

d) more than 1 m.

thanx to Art Hobson

NEXT-TIME QUESTION

Ozone (O_3) shields us from most of the Sun's harmful UV, and is present in the atmosphere at an average concentration of only 0.3 parts per million. Although Earth's atmosphere extends upward for about 250 km, if it were squeezed down to the density and pressure it normally has at sea level, it would be only 8 km thick. Interestingly, the thickness of compressed atmospheric ozone would then be

a) less than 1 mm.
b) between 1 mm and 1 cm.
c) between 1 cm and 1 m.
d) more than 1 m.

Answer: b

Since ozone makes up only 0.3 millionths of the atmosphere, the thickness would be three ten-millionths of 8 km. That's 0.3×10^{-6} (8 km) = 2.4×10^{-6} = 2.4 mm.

Until the 1987 signing of an international treaty to combat the production of ozone-destroying chemicals, the world was on a path that would have destroyed much of our atmospheric ozone. Although the treaty phased out nearly all these chemicals, atmospheric ozone is not expected to return to normal levels until at least 2050.

© 2008 Paul G. Hewitt