

Instructor's guide This activity follows Temperature of the Earth.

Estimate the optical depth for infrared light with wavelength $15\text{ }\mu\text{m}$ when it travels through our atmosphere at standard temperature and pressure STP . The number density of air molecules at STP can be found from $pV = Nk_B T$.

Our air is 0.041% CO_2 (410 ppm).

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Figure 1: Absorption cross sections σ_a . The graph is from *Fundamentals of Atmospheric Radiation* by Craig Bohren, a highly recommended book.