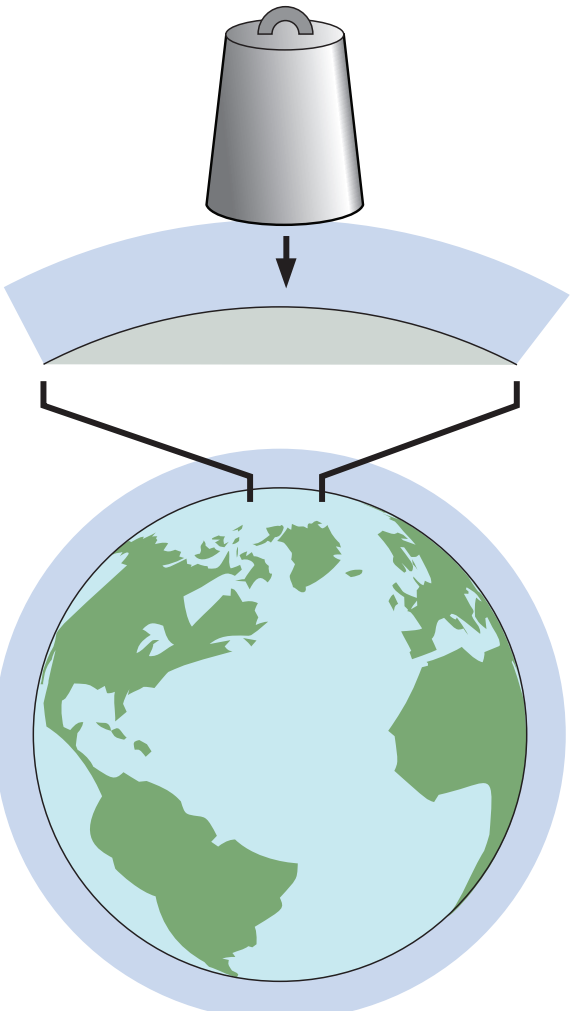
WHAT IS THE MASS OF CONTEMPORARY CO_2?



$$p_{atmosphere} \approx 10^5 \text{ Pascal} \approx 10^5 \frac{N}{m^2}$$

$$A_{earth} \approx f \times 10^{14} \text{ m}^2$$

$$g \approx 10 \frac{m}{s^2}$$

$$m_{atmosphere} \approx \frac{p_{atmosphere} \times A_{earth}}{g} \approx \frac{10^5 \text{ N}}{m^2} \times \frac{1 \text{ s}^2}{10 \text{ m}} \times f \times 10^{14} \text{ m}^2$$

$$\approx f \times 10^{18} \text{ kg}$$

$$mw_{air} \approx f \times 10^{-2} \frac{kg}{mol} \approx f \times 10^{25} \frac{\text{molecules}}{kg}$$

$$c_{CO_2} \approx \frac{420 \text{ } CO_2 \text{ molecules}}{10^6 \text{ air molecules}}$$

$$N_{CO_2} \approx m_{atmosphere} \times mw_{air} \times c_{CO_2}$$

$$\approx f \times 10^{18} \text{ kg} \times \frac{f \times 10^{25} \text{ molecules}}{kg} \times \frac{420 \text{ } CO_2}{10^6 \text{ molecules}}$$

$$\approx f \times 10^{40} \text{ } CO_2 \text{ molecules}$$

$$mw_{CO_2} \approx 0.044 \frac{kg}{mol} \approx 10^{25} \frac{\text{molecules}}{kg}$$

$$m_{CO_2} \approx \frac{N_{CO_2}}{mw_{CO_2}} \approx \frac{f \times 10^{40} \text{ } CO_2 \text{ molecules}}{10^{25} \text{ molecules / kg}} \approx f \times 10^{15} \text{ kg } CO_2$$