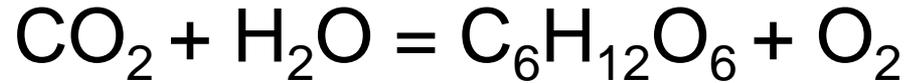


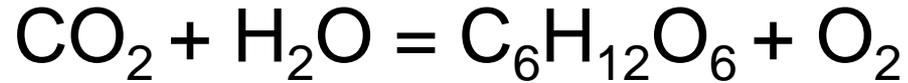
Each year plants fix 1.4 billion tons of CO₂.



Given that the concentration of CO₂ is 380 ppm and the pressure of CO₂ is 3.8×10^{-4} atm at 298 K.

Given that the mass of the atmosphere is 5×10^{18} kg, calculate the mass of carbon that would be fixed as glucose if all of the CO₂ were taken up by plants.

Each year plants fix 1.4 billion tons of CO₂.



given that the concentration of CO₂ is 380 ppm and the pressure of CO₂ is 3.8×10^{-4} atm at 298 K.

Given that the mass of the atmosphere is 5×10^{18} kg, calculate the mass of carbon that would be fixed as glucose if all of the CO₂ were taken up by plants.

Solution: The total mass of CO₂ is

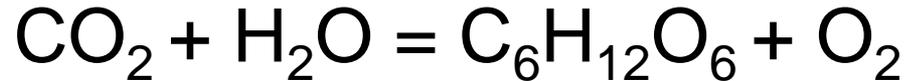
$$m_{\text{CO}_2} = (3.8 \times 10^{-4})(5 \times 10^{21} \text{ grams})$$

$$m_{\text{CO}_2} = 1.9 \times 10^{18} \text{ grams}$$

Convert this mass to moles

$$n_{\text{CO}_2} = \frac{1.9 \times 10^{18} \text{ grams}}{44 \text{ grams/mole}} = 4.32 \times 10^{16} \text{ moles}$$

Each year plants fix 1.4 billion tons of CO₂.



Given that the concentration of CO₂ is 380 ppm and

The pressure of CO₂ is 3.8×10^{-4} atm at 298 K.

Given that the mass of the atmosphere is 5×10^{18} kg, calculate the mass of carbon that would be fixed as glucose if all of the CO₂ were taken up by plants.

Calculate the molar mass of glucose:

$$M_{\text{C}_6\text{H}_{12}\text{O}_6} = 6(12) + 12 + 6(16) = 180 \text{ g/mol}$$

Calculate the grams of glucose using the molar ratio
Of 1:6

$$m_{\text{C}_6\text{H}_{12}\text{O}_6} = \frac{(4.32 \times 10^{16} \text{ moles})(180 \frac{\text{g}}{\text{mol}})}{6}$$

The mass is 1.30×10^{18} grams or 1.3 trillion tons.