Each year plants fix 1.4 billion tons of CO_2.

$$CO_2 + H_2O = C_6H_{12}O_6 + O_2$$

Given that the concentration of CO_2 is 380 ppm and the pressure of CO_2 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 CO_2 were taken up by plants.

Each year plants fix 1.4 billion tons of CO_2.

$$CO_2 + H_2O = C_6H_{12}O_6 + O_2$$

given that the concentration of CO_2 is 380 ppm and the pressure of CO_2 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 CO_2 were taken up by plants.

Solution: The total mass of CO_2 is

$$m_{CO_2} = (3.8\ x\ 10^{-4})(5\ x\ 10^{21}\ grams)$$

$$m_{CO_2} = 1.9\ x\ 10^{18}\ grams$$

Convert this mass to moles

$$n_{CO_2} = \frac{1.9\ x\ 10^{18}\ grams}{44\ grams/mole} = 4.32\ x\ 10^{16}\ moles$$

Each year plants fix 1.4 billion tons of CO_2.

$$CO_2 + H_2O = C_6H_{12}O_6 + O_2$$

Given that the concentration of CO_2 is 380 ppm and The pressure of CO_2 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 CO_2 were taken up by plants.

Calculate the molar mass of glucose:

$$M_{C_6H_{12}O_6} = 6(12) + 12 + 6(16) = 180\ g/mol$$

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

$$m_{C_6H_{12}O_6} = \frac{(4.32\ x\ 10^{16}\ moles)(180\ \frac{g}{mol})}{6}$$

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