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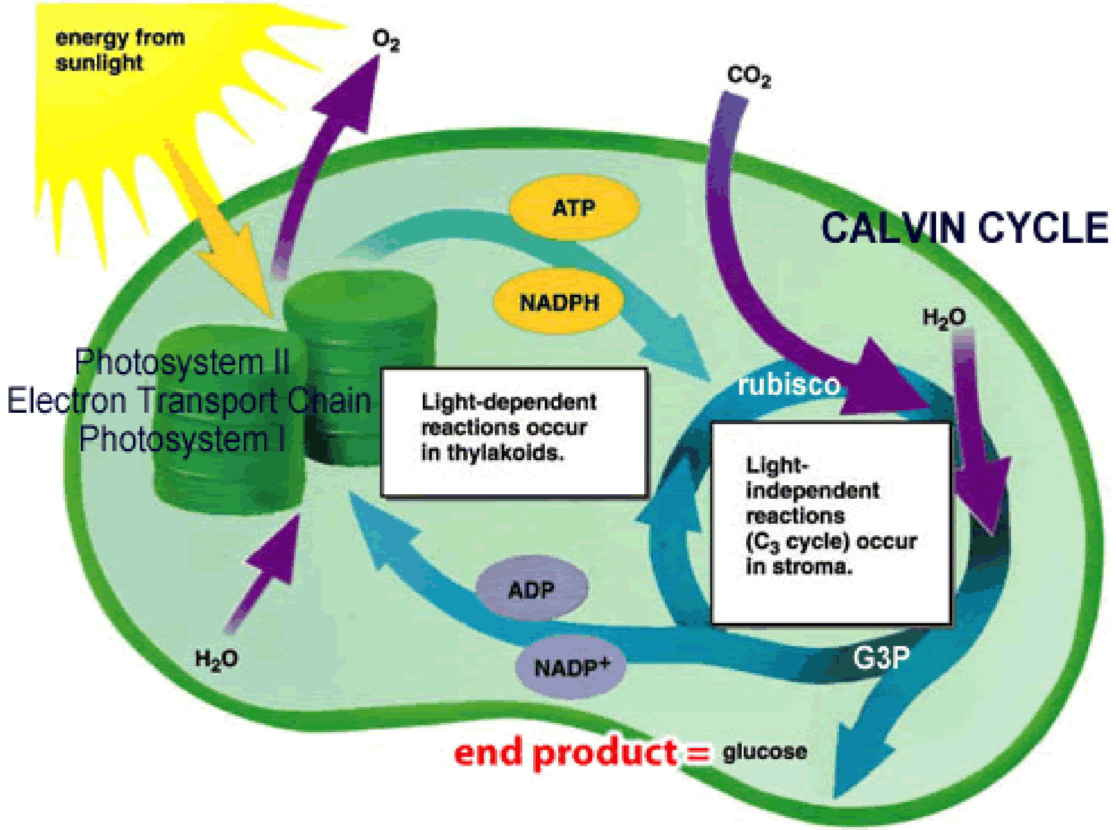

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Solution: First, we need to balance the chemical equation:

$$6\ CO_2 + 6\ H_2O = C_6H_{12}O_6 + 6\ O_2$$

We have established that the mole ratio of CO_2 to H_2O is 1:1. Now, we need to determine which pressure is the smallest to find the limiting reagent. We can use ppm to calculate mole fraction.

$$x_{CO_2} = 380\ x\ 10^{-6} = 3.8\ x\ 10^{-4}$$

and Dalton's law to obtain the pressure:

$$P_{CO_2} = x_{CO_2}P_{total} = (3.80\ x\ 10^{-4})(1\ atm)$$

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Solution: Thus, we need to compare

CO_2: $P_{CO_2} = 3.8\, x\, 10^{-4}\, atm$

H_2O: $P_{H_2O} = 0.034\, atm$

Hence, CO_2 is the limiting reagent.

Dalton's law

Dalton's law states that the partial pressure of a gas in a mixture is equal to its mole fraction times the total pressure.

$$P_i = x_i P_{total}$$

For example, we know that the atmosphere is 20% O_2. This is the same thing as saying that the mole fraction of O_2 is 0.2. Since the total pressure of the atmosphere is 1 atm at sea level, we conclude that

$$P_{O_2} = 0.2\ atm$$