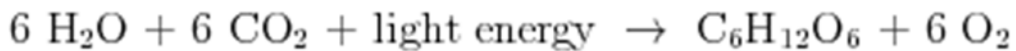


Are germinating beans undergoing photosynthesis or cellular respiration?

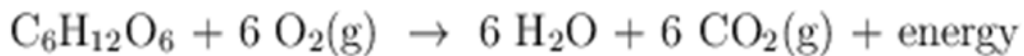
Introduction:

Plants make their own food, glucose. Then they convert that glucose into energy to do the work of growing and maintaining homeostasis. When plants make sugar they convert Sunlight energy and water and carbon dioxide into glucose and oxygen by the following equation:



Chemically opposite to this is the process of cellular respiration. Cellular respiration is the process of converting the stored chemical energy in organic molecules into immediately useable forms. The organic substances are oxidized by oxygen during respiration. Oxygen must be supplied in order for the process to continue.

Glucose can be oxidized completely, if sufficient oxygen is available, to form water, carbon dioxide, and energy by the following equation:



All organisms, including plants and animals, respire. That is they oxidize glucose for energy. Often, this energy is used to convert ADP and phosphate into ATP.

What would occur to CO₂ levels if you placed a living mouse into sealed jar? Initially there would be air in the jar, so the mouse could breath for a while. Assume the mouse is not left in the jar long enough for it to suffocate. Would the CO₂ level increase or decrease? Why?

Your Task:

Using the CO₂ Gas Sensor, and the TI Inspire calculator, you will monitor the carbon dioxide level while beans germinate. Both germinating and non-germinating beans will be tested. Find out whether the CO₂ levels are increasing, decreasing, or remaining the same in non-germinating beans and germinating beans.

Based on your results state whether or not the non-germinating beans and the germinating beans are undergoing photosynthesis, cellular respiration, or neither. Provide data to support your argument. Also support your argument with reasoning.

Could you change conditions of the experiment to cause the opposite reaction to occur? How would you do that?