

**The 3 Pathways of Carbon Dioxide Fixation in Different Plants**

	<b>C3</b>	<b>C4</b>	<b>CAM</b>
<b>Example</b>	Apples, roses, tomatoes	Bermuda grass, sugar cane, corn	Cactus, succulents, pineapple
<b>Leaf Structure</b>	Mesophyll cells loosely packed	Bundle sheath cells tightly packed around vein and separated from loosely packed mesophyll	Large vacuoles in mesophyll cells
<b>Enzyme utilized to fix CO<sub>2</sub></b>	Rubisco	Pepco	Pepco
<b>Optimum Temp.</b>	15°C – 25°C	30°C +	35°C
<b>Carbon Fixation</b>	Same time and place in mesophyll	Physically separates CO <sub>2</sub> intake/fixation and Calvin Cycle in different cells	Separates CO <sub>2</sub> intake/fixation and Calvin Cycle by time of day
<b>Other Characteristics</b>	Characteristic of most plants. Efficient at midrange temperatures where a majority of plants grow. Mesophyll cells fix CO <sub>2</sub>	More efficient in hot, dry environments. Pepco reduces the amount of photorespiration as it will not bind with O <sub>2</sub> like rubisco. Mesophyll cells fix CO <sub>2</sub> the bundle sheath cells produce sugars in Calvin Cycle.	Can fix CO <sub>2</sub> at night as stomata are closed during the day to conserve water. Not as efficient as C3 or C4 plants but can live in arid and stressful conditions.
<b>Picture</b>	<p>The diagram shows a vertical green box representing a cell. At the top, O<sub>2</sub> is released. Inside the box, a circular arrow labeled 'CALVIN CYCLE' is shown. Below the cycle, a 2-C compound is produced, which then leads to the release of CO<sub>2</sub> + H<sub>2</sub>O at the bottom.</p>	<p>The diagram shows two stacked green boxes representing different cells. In the top box, CO<sub>2</sub> enters and forms a 4-C compound. An arrow points down to the bottom box, where CO<sub>2</sub> enters the 'CALVIN CYCLE' to produce 3-C sugar.</p>	<p>The diagram shows a vertical green box representing a cell. The background is split into a blue 'Night' section and a green 'Day' section. At night, CO<sub>2</sub> enters and forms a 4-C compound. During the day, CO<sub>2</sub> is released from the 4-C compound and enters the 'CALVIN CYCLE' to produce 3-C sugar.</p>