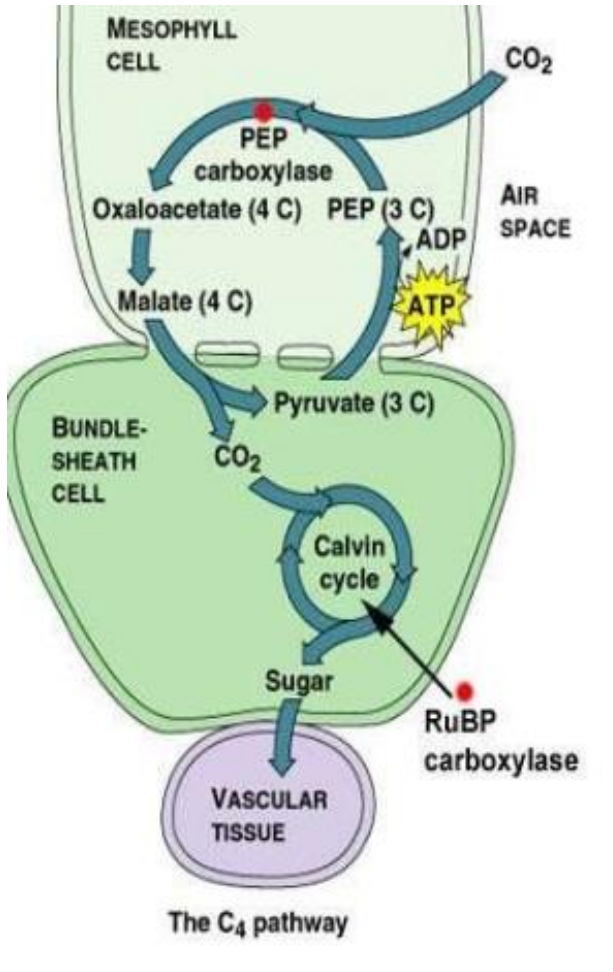


## Alternate Mechanisms of Carbon Fixation

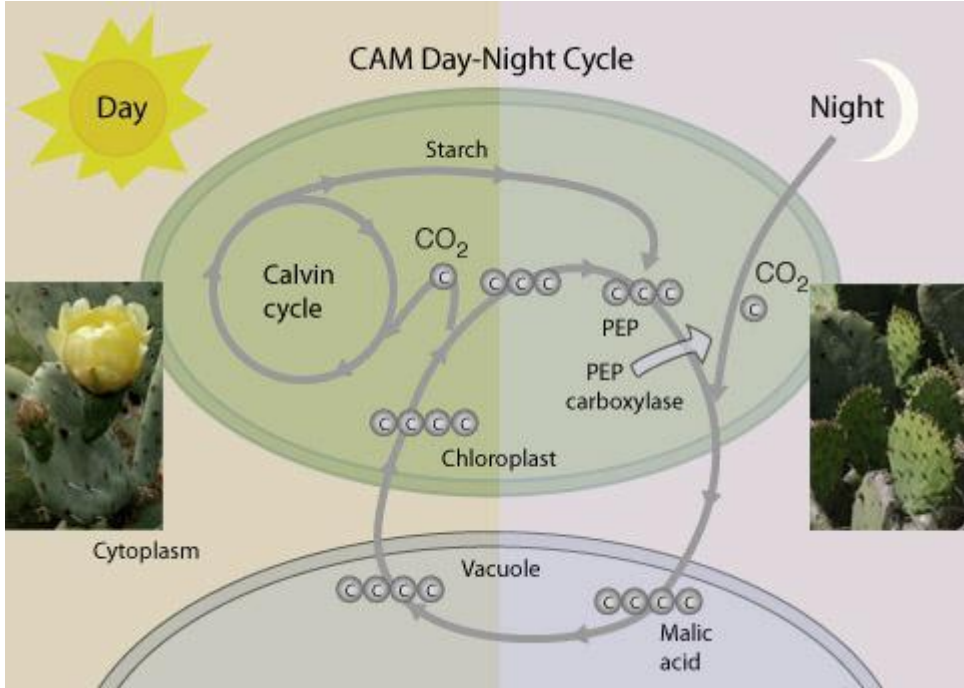
**Rubisco** → catalyzes 2 reactions: \_\_\_\_\_ & \_\_\_\_\_  
 →  
 → has a greater affinity for \_\_\_\_\_

| Photosynthesis       | Photorespiration     |
|----------------------|----------------------|
| Rubisco Substrate:   | Rubisco Substrate:   |
| Products:            | Products:            |
| What happens?        | What happens?        |
| Optimal Temperature: | Optimal Temperature: |

### C4 Plants:

|  |  |
|--|--|
| <p>Enzyme:</p> <p>Product:</p> <p>Types of Plants:</p> <p>Types of Cells:<br/>                     Bundle Sheath</p> <p style="padding-left: 40px;">Mesophyll</p> <p>Purpose:</p> <p>Energy Comparison to C3 Plants:</p> |  <p style="text-align: center;">The C<sub>4</sub> pathway</p> |
|--|--|

## Crassulacean Acid Metabolism (CAM) Plants:

|                   |  |
|-------------------|--|
| Stomata action:   |  |
| Why?              |  |
| <b>NIGHT:</b>     |  |
| Enzyme:           |  |
| Product:          |  |
| Storage Location: |  |
| <b>DAY:</b>       |  |
| What happens?     |  |

### In Class Questions:

- Define photorespiration.
  - What gas can compete with  $\text{CO}_2$  for the binding site of the enzyme rubisco?
  - Under normal conditions, what proportion of fixed carbon is affected by photorespiration in  $\text{C}_3$  plants?
  - Compare the end products of photosynthesis and photorespiration.
- How does temperature affect the relative amounts of photosynthesis and photorespiration that occur in  $\text{C}_3$  plants?
- Label A, B, C, D, and E in Figure 5.
  - What type of cell-cell connection do malate and pyruvate go through to move from one cell into the other?
- What is the main difference between the ideal environments of  $\text{C}_4$  plants and CAM plants?
  - Name two  $\text{C}_4$  plants and two CAM plants.
- At what time of the day would you expect to find the most malate in CAM plants?
  - When would you find the least amount of malate in CAM plants?
  - Why do plants that use CAM photosynthetic pathways close their stomata during the day?
  - During the cool of evening, CAM plants open their stomata. What gas is preferentially absorbed at this time?
  - Explain how this gas is stored for daytime use.