Alternate Mechanisms of Carbon Fixation

Why are there alternate forms of carbon fixation?

<u>Rubisco</u> → **catalyzes 2 reactions: _____ & _____**
→
→ **has a greater affinity for _____**

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

<u>C4 Plants:</u>

Enzyme:

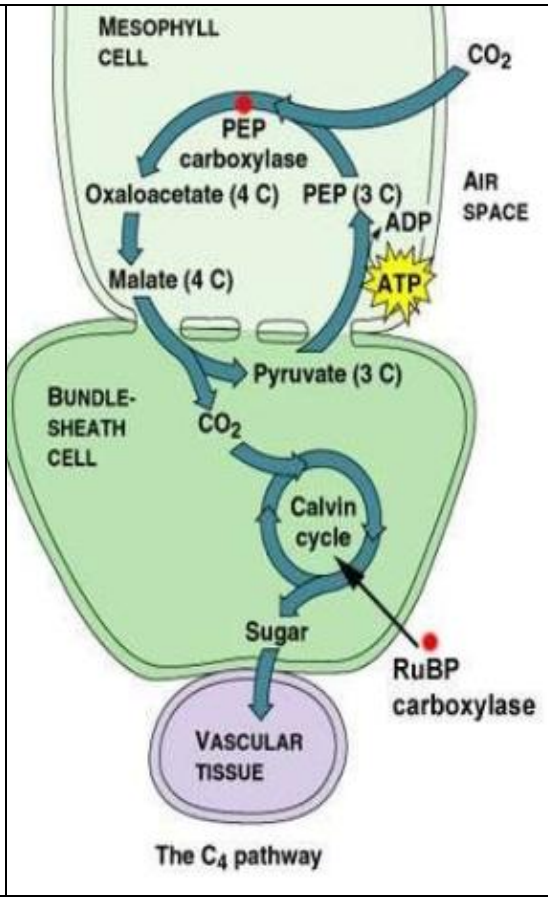
Product:

Types of Plants:

Types of Cells:
- Bundle Sheath
- Mesophyll

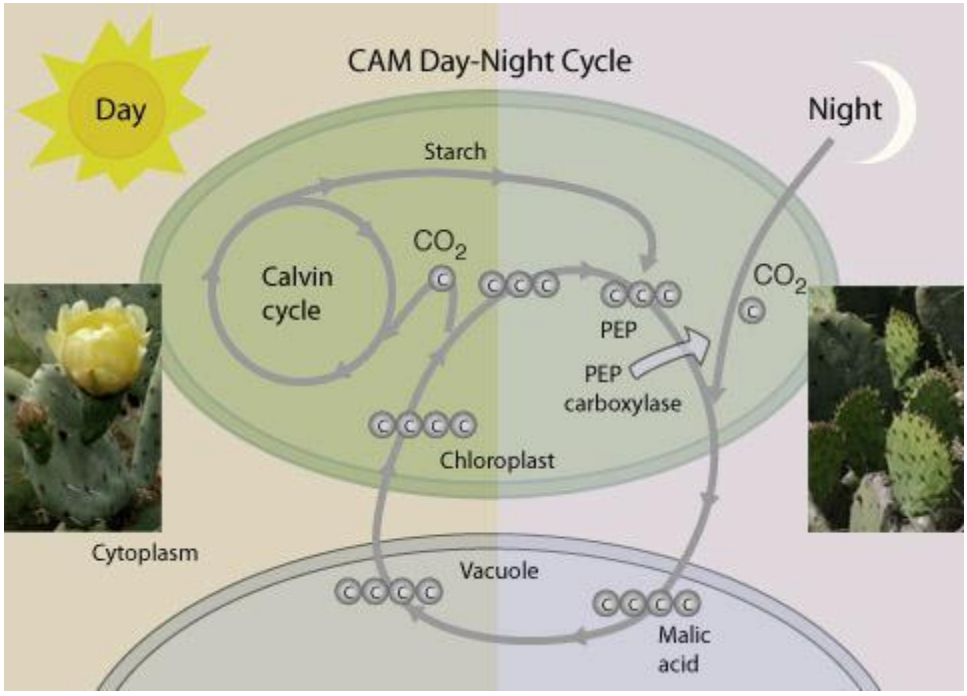
Purpose:

Energy Comparison to C3 Plants:



The C_4 pathway

Crassulacean Acid Metabolism (CAM) Plants:

Stomata action: Why? **NIGHT:** Enzyme: Product: Storage Location: **DAY**: What happens?	

1. (a) Define photorespiration.
   (b) What gas can compete with CO2 for the binding site of the enzyme rubisco?
   (c) Under normal conditions, what proportion of fixed carbon is affected by photorespiration in C3 plants?
   (d) Compare the end products of photosynthesis and photorespiration.

2. How does temperature affect the relative amounts of photosynthesis and photorespiration that occur in C3 plants?

3. (a) Label A, B, C, D, and E in Figure 5.
   (b) What type of cell–cell connection do malate and pyruvate go through to move from one cell into the other?

4. (a) What is the main difference between the ideal environments of C4 plants and CAM plants?
   (b) Name two C4 plants and two CAM plants.

5. (a At what time of the day would you expect to find the most malate in CAM plants?
   (b) When would you find the least amount of malate in CAM plants?
   (c) Why do plants that use CAM photosynthetic pathways close their stomata during the day?
   (d) During the cool of evening, CAM plants open their stomata. What gas is preferentially absorbed at this time?
   (e) Explain how this gas is stored for daytime use.