

TEACHER'S NOTES LESSON 17

Present these key points and questions to the students during the *Activities* section of Lesson 17, as your lecture/discussion.

C3, C4 and CAM Plants: Discuss differences in plant types. C3 plants – tomatoes, rice, wheat, soybeans and potatoes. C4 plant – corn. CAM plants – cactus, pineapple. We have just discussed photosynthesis in C3 plants. C4 plants have waxy leaves and CAM plants are succulents, which have thick surfaces, which makes it more difficult for CO₂ to enter the leaves by diffusion. It must enter through stomata, little openings on the bottom of leaves. They can close during the day when it is hot and dry to conserve water, but this causes an accumulation of oxygen. High oxygen levels in a leaf trigger photorespiration; a process that wastes fixed CO₂, which in turn lowers the plant's ability to make sugars. Therefore, C4 plants fix CO₂ twice through an intermediate called Oxaloacetate. They do so by fixing carbon twice in different types of cells. CAM plants fix carbon in the same cells but at different times.

Overall Review

1. First of all, tell the students that photosynthesis flows in the opposite direction of respiration. For instance, in respiration the Krebs cycle is first followed by the electron transport system. In photosynthesis, the electron transport system is first followed by the Calvin cycle. This is logical because photosynthesis makes energy and stores it in chemical bonds while respiration releases the energy in chemical bonds to form ATP.
2. Show a slide or overhead, an image of the two cycles together such as Starr's textbook Biology concepts and applications fig 6.14 p. 105 and fig 7.3 on p. 111. Have students copy it into their notes.
3. Write on the board the following table and have students copy it into their notes:

Comparison of respiration and photosynthesis	
Mitochondria	Chloroplasts
Krebs cycle – uses glucose to form: acetyl CoA CO ₂ NADH H ⁺ e ⁻ FADH	Electron transport chain – uses: ATP NADPH
Electron transport chain – uses: NADH H ⁺ e ⁻ FADH O ₂ to form ATP and H ₂ O	Calvin cycle - uses: ATP NADPH to form sugar, starch and cellulose

4. Make sure they understand these differences and how they fit into the overall cycle of energy transfer in life (image/diagram found in Lesson 15: How Cells Acquire Energy).
5. Take any questions students may have.