

CHAPTER 5	Thought Lab 5.2: Adaptations and Applications of Photosynthesis Answer Key	BLM 5.2.8A
ANSWER KEY		

Answers to Analysis Questions

1. a) C₃ plants: most common trees, flowers, and herbs. C₄ plants: crabgrass (*Digitaria sanguinalis*), corn (*Zea mays*), sorghum (*Sorghum vulgare*), and sugarcane (*Saccharum officinale*) are most commonly encountered. CAM plants: cacti and stonecrops (*Sedum* species).
 - b) The problem is an environmental one relating to the plant your group selected; for example, cacti live in places with high temperatures and evapotranspiration rates, so their stomata are closed during the day. Your group should describe the solution appropriate for the plant. Cacti fix carbon at night, forming malic acid. During the day, malic acid is decomposed into carbon dioxide and a 3-carbon molecule, which supplies carbon dioxide when light is available.
2. Similarities include the use of ATP, NADPH, and the Calvin-Benson cycle. Differences are localized as to how carbon dioxide is provided to the cycle. In C₃ plants, carbon dioxide is provided directly through diffusion. In C₄ plants, diffusion is augmented by the formation of 4-carbon compounds during the day, which are transported into the bundle sheaths where they are decomposed to release carbon dioxide. In CAM plants, stomata are opened at night and carbon dioxide is fixed to malic acid, which is stored in vacuoles. During the day, malic acid decomposes to release carbon dioxide.
3. The more specific the link and the example used for each topic, the better.
4. You should provide a clear outline of your opinion and a few key points that support your opinion. There is no right or wrong answer, but you must provide support for your opinion based on your readings.