

Name: _____ Student ID: _____
CHEM 161 PAL Fall 2026

Worksheet #29: Calvin Cycle

1. What are the three stages of the Calvin cycle?

Stage 1:

Stage 2:

Stage 3:

2. Draw an overview of the Calvin cycle that illustrates its three phases. Include the complete chemical structures of CO_2 , H_2O , 3-phosphoglycerate, 1,3-bisphosphoglycerate, glyceraldehyde-3-phosphate, dihydroxyacetone phosphate, ribulose-5-phosphate, and ribulose-1,5-bisphosphate. Clearly indicate the stoichiometry of all metabolites and cofactors required to fix CO_2 and produce triose phosphate.

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3. Which enzymes are shared by the Calvin cycle and glycolysis? For each enzyme, compare the reaction it catalyzes and the direction in which the reaction proceeds in the two pathways.
4. What is the ratio of NADPH to ATP consumed by the Calvin cycle? How can plant cells adjust ATP production relative to NADPH production to meet this stoichiometric demand?
5. The enzyme RuBisCO makes up about 50% of the soluble protein in chloroplasts. Explain this observation.