Standards Alignment

TOPS Biology labs are designed for students to learn that “scientific progress is made by asking meaningful questions and conducting careful investigation” as specified by the California State Science Standards. The TOPS experiments are designed to integrate into a teacher’s current curriculum, and employ a biochemical focus to enhance and bridge the biology and chemistry curricula. The experiments utilize modern technology including computer driven instruments of the type used in local industrial laboratories as well as commercially available data analysis software.

Photosynthesis:
Chromatographic separation of plant pigments, pH assessment for evaluation of alternative photosynthesis strategies.
Uses pH meter, TLC apparatus.
Standards 1c*, 1f*, 1g, 6d

Investigation and Experimentation Standards: 1 a, b*, c, d, e, j, l


Assessment of TOPS Biology Labs for 2009-2011

Direct assessment using release questions drawn largely from the California Standards Test (CST Biology 2005 & 2009) shows the following effect on student conceptual understanding of topics associated with the hands-on activity:

Topic: Plants/Photosynthesis*
Number of participating students: 345
Change in score: 5% increase (post-pre). High initial scores.
Analysis of variance shows this change is statistically significant (F(1,345) = 14.6, p < 0.001, η² = 0.04) with a small effect size of the activity on student scores.

*Assessments revised in summer 2011