

INQUIRY LEARNING AT CONSORTIUM SCHOOLS

The NY Performance Standards Consortium embraces and supports an *inquiry-based* approach to teaching and learning as the core curricula in its member schools. Since the ultimate goal of inquiry-based (sometimes known as *problem based*) learning is to educate students to be self-directed, independent, life-long learners (Hung, et al., 2008), the Consortium regards each of its components as integral to its pedagogy.

INTRODUCTION

Inquiry and problem-based learning was originally developed in the 1950s to enable medical students to apply knowledge learned to solve problems in real life medical situations (Awan, R. et al., (2017); Hung,, W. et al., 2008; Lonergan, R. et al., 2022). K-12 problem-based learning implementation occurred in the 1990s (Hung., et al., 2008).

This approach to learning has been defined in several ways:

1. “An instructional method that initiates students’ learning by creating a need to solve an authentic problem” (Hung, et al., 2008).
2. “A method of inquiry where students solve difficulties, oddities, qualms, and problems in the context of real life” (Awan, R. et al., 2008).
3. “An instructional (and curricular) learner-centered approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem” (Savery, J.R. 2006).

The unifying characteristic common to these definitions is that students have the responsibility for their own learning. Other problem-based learning characteristics relevant to Consortium high school pedagogy are (Hung, et al., 2008; Savery, J.R. 2006):

1. The problems that students are required to solve must be open-ended and allow for free inquiry.
2. Collaboration with group members is essential.
3. Information that students collect through their research must be reanalyzed and applied back to the problem.
4. A closing analysis of what students have learned from their research is essential. This includes student discussion as well as self and peer assessment.

5. Student assessments must be both knowledge-based and process-based.
6. The pedagogical base must be a problem-based curriculum and not one that is teacher-centered.

Sadeh, I. and Zion, M. (2009) have further clarified the first problem-based learning characteristic. There are three levels at which students can solve problems. The lowest level (structured inquiry) is teacher-directed where teachers provide the question to be solved as well as the prescribed procedure. At the intermediate level (guided inquiry) the students may choose a teacher-supplied question but devise their own research design. At the highest level (open inquiry) it is the students' responsibility to formulate the question, design the procedure, and find a solution.

One critical difference between the guided and open levels is the role of the teacher. In guided inquiry the teacher is both facilitator and source of information. In open inquiry the teacher is only the group supporter and facilitator. Researching information and engaging in higher order thinking necessary to solve the problem is therefore the students' responsibility (Savery, J.R., 2006).

The Consortium regards each of the above six elements as integral pedagogical components. In addition to demonstrating positive long-term effects on their self-directed, life-long learning skills and attitudes, the literature cites numerous studies that provide strong evidence that student-centered, problem-based learning significantly improves students' ability to develop critical higher order thinking and problem-solving skills compared with students in traditional teacher-centered classes (reviewed in Garicke, N., et al., 2022; Hung, et al., 2008; Karan, E., and Brown, L., 2022). Studies have shown that inquiry-based high school science students regardless of race (Wilson, C.D., et al., 2009) or who are low achievers with long histories of failure (Yerrick, R.K., 2000), reach significantly higher levels of achievement in knowledge, reasoning, and argumentation. Since teacher-centered classes typically emphasize coverage over depth, the typical means of evaluating student achievement is the standardized test. In a controlled investigation Stanger-Hall (2017) concluded that multiple choice standardized testing hindered critical thinking in introductory science courses. In lieu of traditional evaluation methods, case studies of secondary school problem-based teaching and learning have documented the powerful impact that performance-based assessments have made on students' intellectual skills (Darling-Hammond, L., Ancess, J., and Falk, B., 1995). Therefore performance-based assessment is the prime tool implemented to evaluate Consortium student achievement.