

This document serves as one key tool related to Project-based Learning and the P-TECH 9-14 model.

OVERVIEW OF PROJECT-BASED LEARNING

Project-based learning (PBL) is instruction that requires students to take part in an extended investigation of a topic or issue in response to an open-ended question or problem.

Project-based learning is a thoughtful way for students to gain the higher order and 21st century skills that they will need for the workplace. The vast majority of STEM-based professional work is project-based. A P-TECH 9-14 school's curriculum should be structured so that PBL projects build upon one another as the content knowledge and skills increase in complexity and rigor each year. Students learn how to manage time and outcomes, work in teams, gain a clear understanding of what a deliverable is, and identify problems and propose solutions. By solving a real-world problem, students gain a deeper understanding of both the content and how it is applied within the 'real-world.'

Project-based learning curricula typically follow a three phase process. The first phase involves an in-depth discussion of a project topic. The teacher should identify topics that are rigorous, engaging, and important for students. This type of project makes the learning more relevant to students' lives, and increases their motivation to complete challenging tasks. At the conclusion of the first phase of a project, teachers and students will develop an inquiry question. This question should be provocative, open-ended and contain a sense of purpose.

During the second phase of PBL, students gather information from a variety of sources, including fieldwork, sessions with experts, research, reading and writing. In real inquiry, students follow a trail that begins with their own questions, leads to a set of resources and the discovery of answers, and often an additional set of questions. Typically, students work in small groups to develop their responses to the inquiry question, thus honing their collaboration, communication and project management skills. Students work together to create an authentic product that can help answer their original question. Throughout this phase, students receive important feedback from the teacher and from one another.

The final phase of PBL is the presentation of a product (or a new solution to a problem) to an interested audience. When students present their work to a real audience, they tend to care more about its quality. Audience members can include peers, parents, college faculty, mentors, industry professionals, and/or government experts. Knowing that well informed colleagues, peers and adults will be waiting to hear their presentation is an excellent motivator for young people.

PBL Project Example: *Health Care High School Interdisciplinary Project*

In the first semester of their ninth grade year, Health Care High School students conducted an interdisciplinary project. It was a collaboration between the Health Careers course (the Workplace Learning class) and English classes. Students received instruction in their Health Careers class on chronic diseases that are pervasive in their Bronx community, especially diabetes, asthma, heart disease, cancer and arthritis, as well as interventions such as motivational interviewing, public education campaigns, dietary changes, community health work, and yoga

and mindfulness. English teachers provided instruction in research, writing, and reading analyses of interventions and program evaluations.

The students did further research on one of the diseases, and created an action plan for prevention of the diseases. For their projects, each student wrote a paper consisting of the following five sections:

1. Identification of a chronic illness, including methods for diagnosis and treatment and prevalence in the Bronx versus other communities,
2. Explanation of how the illness affects the biology of the human body,
3. Explanation of the significance of the illness in his/her community and why it is important to address the problem,
4. A proposal for an intervention to reduce the prevalence of the illness, and
5. A description of how to track and measure success.

The students presented their action plan papers and methods for measuring success of the intervention in a roundtable format to health care industry professionals and professors from their partner college. These guests asked questions of the students, and offered positive and critical feedback on the action plans. They also served as readers for the students' project papers, which included submitting comments and relevant questions. Following this, 5-10 of the highest quality projects were selected to test. Authors of these projects assembled research teams of an additional 3-5 students. Working after school, students adapted their projects for implementation. This included testing their interventions, gathering data about success, analyzing data, evaluating outcomes, and preparing and delivering presentations to an audience of professionals and experts.

PROJECT-BASED LEARNING RESOURCES:

Many educators and researchers have developed resources and examples that can help schools implement a project-based learning approach.

Websites:

- The Buck Institute
 - <http://www.bie.org/>
 - <http://bie.org/resources>
- Project-Based Learning vs. Problem-Based Learning vs. X-BL
 - <http://www.edutopia.org/blog/pbl-vs-pbl-vs-xbl-john-larmer>
- Foundations in Visual Arts (new media and entertainment), Grades 9 and 10
 - <http://dma.edc.org/philosophy-and-approach-tutorial>
- Assessment With CTE Project-Based Learning
 - http://publications.sreb.org/2013/AC_assessment_background_8_5_13.pdf
- New York State Bilingual Common Core Initiative
 - <http://www.engageny.org/resource/new-york-state-bilingual-common-core-initiative>

Books:

- PBL for 21st Century Success: http://bie.org/shop/product_detail/pbl_for_21st_century_success
- PBL Starter Kit (made for teachers who are new to PBL):
http://bie.org/shop/product_detail/pbl_starter_kit
- PBL 101 Workbook: http://bie.org/shop/product_detail/pbl_101_workbook

Videos:

- PBL Explained
 - http://www.bie.org/videos/video/project_based_learning_explained
- Project-Based Learning in Maine at King Middle School and Casco Bay High School:
 - http://www.pbs.org/newshour/bb/education-jan-june13-learning_05-06/
 - <http://www.edutopia.org/stw-maine-pbl>
- Transformed by Technology and Project-Based Learning: High Tech High:
 - <http://youtu.be/bcSsrgPmajE>
- Problem-based case learning –Tennessee Technical College:
 - <http://www.makinglearningreal.org/>
- Design thinking model – Sweat Equity Enterprises:
 - http://www.youtube.com/watch?v=2Vv_EjeErFY
- Expeditionary Learning Outward Bound
 - <http://www.youtube.com/watch?v=zc-siZDsawE>
- 10 Tips for Essential Questions for PBL Curricular Development, Teacher Support
 - <http://www.youtube.com/watch?v=StjLRLLAie8&list=PLvzOwE5IWqhTHcxb3bucE8losOIlkEWsr>
- Project-Based Learning: How Teachers Plan It
 - <http://www.youtube.com/watch?v=1DXvAPIefV4&list=PLvzOwE5IWqhTHcxb3bucE8losOIlkEWsr>
- Project-Based Lesson Planning Tool
 - http://www.youtube.com/watch?v=YWh0act_9HE&list=PLvzOwE5IWqhTHcxb3bucE8losOIlkEWsr
 - http://www.bie.org/project_planner/
- 21st Century Skills Culture - Case Study High Tech High School
 - <http://www.youtube.com/watch?v=rrwO357zR8c>
- 21st Century Skills Assessment

- <http://www.youtube.com/watch?v=n2WKCBxeoxU>
- PBL Case Study- Restructuring the Day and Using Technology More Smartly
 - <http://www.youtube.com/watch?v=D84sJwKVwoE>
- PBL Example for ELA 8th Grade - Relevant for 9th Grade
 - <http://www.pblu.org/projects/resilience-cafe>
- PBL Example for Math 10th/11th Grade
 - <http://www.pblu.org/projects/mazer-tag>
- PBL Example for ELA 9th/10th Grade
 - <http://www.pblu.org/projects/cyranos-funk>
- PBL at Learning Gate Community School
 - <http://www.youtube.com/watch?v=vgQCXMylcZ4#t=178>
- School Uses PBL Over Testing
 - <http://www.youtube.com/watch?v=waKZQ9gaBkl>
- Project-Based Learning at Ace Leadership High School
 - <http://www.youtube.com/watch?v=dwciYLN2Y3c>

For more information about the P-TECH 9-14 model, please visit ptech.org