

Project-Based Learning: An Interdisciplinary Approach

Purpose

This document defines, explains, and offers strategies for designing Project-Based Learning units that are cross-curricular and can be effective in any learning environment. Explanations of and resources for sample driving questions and their interdisciplinary potential, strategies for establishing criteria, the use of planners and graphic organizers, and components of creating milestones are also included.

Introduction: The Cross-Curricular Nature of Project-Based Learning

Project-Based Learning, with the essential elements of the [Gold Standard Design](#) in place, lends itself to interdisciplinary and transdisciplinary learning. An interdisciplinary approach supports students as they use and develop an understanding of concepts and skills from other disciplines. This takes place as they seek out their solution to the driving question (Boss & Larmer, 2018; Drake, 2012). A transdisciplinary approach goes beyond learning in school, with a deliberate focus on learning outside of the classroom that can support flexible pathways (e.g., work-based learning, authentic inquiry, service learning, etc.). A real-world context, transferable skills, and a personalized inquiry path are incorporated in transdisciplinary content (Drake, 2012). Both have a place in Project-Based Learning and a unit can be simultaneously interdisciplinary and transdisciplinary. With the right structure, facilitation, and unit design, educators can guide students through rigorous cross-curricular learning experiences.

Sample Driving Questions and Cross-Curricular Connections

With the strategies above and the elements of the Gold Standard Design as guidance, each of the performance indicators below can be easily adapted as a driving question for a cross-curricular Project-Based Learning unit. These questions should be open-ended, and the language should be inviting; this will help students as they initiate their learning and think about the broad applications of the content that they are about to investigate.

Consider the steps that students might take to answer each of the sample driving questions below. Reflect on the following:

- How might lessons that are currently taught fit into this process?
- How can framing the indicator in Project-Based Learning make the process personalized and relevant?
- How can the learning be interdisciplinary?
- How can this work in a remote or hybrid learning model?

Contact Information:

If you have questions about this document or would like additional information, please contact:

Kyle Anderson, Student Pathways, at kyle.anderson@vermont.gov, or

Emily Leute, Student Pathways, at emily.leute@vermont.gov.

Visual Arts

Performance Indicator

Identify how art is used to inform or change beliefs or behaviors of an individual or society. (VA:Cn10.1.5)

Driving Question

How can artwork be used to inspire change in social or environmental issues that we care about?

How Can This Be Cross-Curricular?

Consider the sources that students will need to investigate to answer this question. This can be open-ended (i.e., it could be left “as is”), or the teacher (or students) can place this under an environmental or social justice theme, whereby lessons and inquiry from science or social studies will begin to play into this visual arts driving question.

Science

Performance Indicator

Construct an argument supported by evidence for how increases in human population and per capita consumption of natural resources impact Earth’s systems. (MS-ESS3-4)

Driving Question

How can we use data to communicate human impact of resources and populations of an ecosystem?

How Can This Be Cross-Curricular?

Emphasizing communication in a Project-Based Learning unit opens doors to interdisciplinary learning, particularly in the arts and ELA. To effectively answer this driving question, students will need to investigate engaging ways to communicate data. These skills can be intentionally investigated in visual, media, and English language arts courses as a part of the inquiry process.

Global Citizenship

Performance Indicator

Construct maps and other graphic representations of both familiar and unfamiliar places (D2.Geo.1).

Driving Question

How can we teach others about new places using maps?

How Can This Be Cross-Curricular?

This question is phrased so that students must consider the place about which they are creating the product and the audience to whom it will be presented. This will help students determine the “need to knows” of this project (e.g., from a Global Citizenship perspective, the components that make a map clear) on their own. To effectively make a map that can be understood and used by their audience, students will need to consider the media with which they are creating the map and the proportions of the items to be included.

The driving questions will require students to use knowledge of the content (e.g., mathematical models to show resource availability, geographic tools, art technique) to determine the solution to whatever issue they choose. With Project-Based Learning, however, learners are determining *how* they acquire the knowledge and skills and for what purpose. Additionally, questions are phrased to ensure students have room to lead themselves toward potential solutions.

Cross-Curricular by Design

When open-ended, student driven units are facilitated, structured, and designed appropriately so that a student’s self-management, communication, and collaboration skills can increase (Brush & Saye, 2000). As students gain knowledge and understanding through authentic and sustained inquiry, they develop and refine transferable skills as well as content knowledge. Intentionally integrating multiple disciplines by establishing and communicating standards-based measurable criteria, providing guidance and scaffolding throughout inquiry and ideation, and developing clear project milestones are the major steps in effectively structuring Project-Based Learning.

Criteria and Guidelines

Developing measurable [criteria](#) for the product and presentation or guidelines for learning that would direct students toward using skills and knowledge from multiple areas in one public product can support teachers in designing [interdisciplinary and transdisciplinary units](#). Creating a [student-friendly rubric](#) that can be used for reflection and self-assessment can serve as a tool for supporting students as they apply skills and knowledge from multiple areas.

Making a product interdisciplinary should not feel like a requirement for students. For an engaged response to an enduring Project-Based Learning unit, students will need to understand the value in applying skills and knowledge from multiple subjects to develop one solution and product. Posing the criteria as questions will keep them student-centered and engaging. Rather than stating, in a [rubric](#) or verbally, “You must include a graphic in your product,” a teacher/facilitator can ask, “How can we use visuals to support our ideas to an audience?”

Graphic Organizers and Planners

To support developing skills in inquiry process, it can be helpful for a teacher to serve as a [strong facilitator](#) and create an [environment that is conducive to student-centered learning](#). For middle and high school students, the Personalized Learning Plan (PLP) could be used to capture and share their individual learning process with peers and teachers across disciplines. Graphic organizers and planners to guide thinking and scaffold ideation can foster a personalized, student-centered environment. These items can also guide students through brainstorming, establishing

collaborative roles, logging resources, and determining why their solution is important to them. Aligning these planners with the criteria for the unit will also support students in the overall process.

Planner Examples

[How can we use data to advocate for an environmental issue?](#)

[How can we design a sustainable community?](#)

Structuring Project-Based Learning with Project Milestones

This open-ended and student-driven approach lends itself to any learning environment or instructional model. Teachers can design a unit with components that are both synchronous and asynchronous (i.e., real-time instruction and independent learning). With [guidance and structure](#), students can develop an understanding and awareness of the resources available to them across the various settings in which their learning can take place. With that awareness, they can determine their best inquiry path for their context and learning preferences, even as their specific learning model may change.

One way of ensuring a well-managed unit is the use of [project milestones](#), which are critical when implementing Project-Based Learning. Milestones should be pre-established, consist of a clear and attainable task, include definitive dates, contain both collaborative and individual components, incorporate a formative assessment framework, and help move each student’s or group’s project forward.



Pre-Established

Teachers should determine milestones before the unit starts. However, in a setting that is well-versed in Project-Based Learning, milestones can be student developed before the inquiry phase.

Including Definitive Due Dates

Student-driven inquiry, an essential element in Project-Based Learning, takes time and could go awry without regular check-ins and definitive dates for completing tasks. This becomes especially important in a remote or hybrid environment. Including due dates and maintaining them throughout the unit will keep students on track. These can become flexible as students become more familiar with the Project-Based Learning approach.

Framed in Formative Assessment

Milestones can serve as an opportunity to gauge student response to the Project-Based Learning approach and their progress through learning. It can be helpful to leverage student PLPs to capture their response and learning over time. Conducting formative assessment in conjunction with these milestones will inform strategies for moving forward and revisions needed for the unit. For more information on this topic, see the formative assessment process outlined in [Assessing Project-Based Learning: An Integral Part of Local Comprehensive Assessment Systems](#).

Moving the Project Forward

Milestones should be points at which students can begin moving into a new stage of their project, even if revisions need to take place after a [critique or feedback](#) session. Students need to see points of progress to stay positive about sustained tasks (Larmer, Mergendoller, & Boss, 2015; Boss & Larmer, 2018).

Collaborative and Individual Components

Effective Project-Based Learning in a varied learning environment can consist of [collaborative and individual](#) components. Social collaborative elements of Project-Based Learning (e.g., engaging in reflective dialogue, critique and revision, etc.) support the learning process and development of transferable skills, including metacognition, self-management, critical thinking, and communication (Boss & Larmer, 2018; Larmer Mergendoller, & Boss, 2015) -- all characteristics of 21st century classrooms (Drake, 2012) and beyond.

With appropriately designed milestones (i.e., those with collaborative and individual tasks), students can be guided through these components and adapt the steps to different settings.

References

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