PBL Unit Planning Guide

Garden Redesign

6th Grade Integrated Content Areas:

Math, Science, Language Arts, Social Studies, Technology & Engineering

Standards

Technology & Engineering

MS-ENGR-EET-1
MS-ENGR-EET-2
MS-ENGR-EET-4

Science

S6E3
S6E4
S6E5

Math

MGSE6.G.1
MGSE6.G.2
MGSE6.G.4

Social Studies

GSE: SS6E13

Language Arts

ELAGSE6W1
ELAGSE6W2

Big Idea

Designing and maintaining a healthy garden requires an integrated, conscientious and comprehensive ecosystem-level approach.

Learning Objectives

At the conclusion of this PBL, STEM cohort members will be able to:

Calculate and illustrate the most efficient garden layout, given spatial and topographical constraints.

Track and allocate funds given a set budget. Defend all decisions.

Present a comprehensive redesign plan to stakeholders. Justify all design elements.

Develop and maintain a balanced, healthy ecosystem that yields geographically and seasonally appropriate production.

Key Terms

- Engineering Design Process
- Geometry
- Biogeochemical Cycles
- Aquaponics
- Budgeting

Process Based Thinking

- Engineering Design Process
- Design Thinking
- Evidence-Based Claims

Formative Assessment

Formative assessments are used throughout all TMS STEM PBLs to ensure mastery of concepts/standards across all content areas and include the following strategies:

- **Self-Assessment-Individual & Group level to be documented in The TMS STEM Notebook.**
- **Informal guided/leading questioning (*can you explain in more detail?, what evidence do you have?*, etc.).**
- **Discreet Observation**

Summative Assessment

Modified TMS STEM Rubric

Community Connections and Partners

- TMS PTO
- Captain Planet Foundation
- Second Story Gardens

Materials and Resources

- Materials will vary per proposal and will include typical garden supplies from our approved vendor Home Depot along with supplies purchased from funds provided by the Captain Planet Foundation and Title I.
- Resources will vary per proposal and will include spreadsheet, 3D rendering, and presentation software.

Lesson Procedures

Real World Hook/ Introduction

Students will find themselves reading a letter from the STEM Coordinator to introduce this PBL. The letter reads: *Greetings 6th Grade STEM Students, as you now know, I am the STEM Coordinator of Tucker Middle School and have recently become concerned about the state of our garden here at TMS! I need YOUR help! We have been given a budget of $1,000 to upgrade our garden—but I don't know where to start! Your amazing 6th grade teachers will give you the details...but our garden pros are going to choose the best idea to run with! I need you to team up, educate yourselves on the TMS garden, identify the best use of money for sprucing up the garden, and develop a stellar presentation to show our garden committee! Good Luck!*

Student Engagement through Process Based Thinking

Groups will be required to document the entire experience. Using the TMS STEM Notebook, each student will write, sketch, journal, plan, and collaborate using the Notebook to document this iterative journey from beginning to end.

Student Presentation

Student groups will pitch their redesign proposals to the Garden Redesign Committee (all four STEM Cohort Subject Area teachers, the 6th Grade STEM Cohort Facilitator, the IB Coordinator, the 6th Grade AP, and representatives from the PTO and any community partners. Groups are free to design their proposal using whatever platform(s) they deem most effective.

Student Reflection

At the conclusion of the PBL, groups will be tasked with reflecting on both their individual journey AND the overall Cohort outcome with the following prompts:

- Which group's proposal was chosen? What merited this choice over other proposals?
- Given what you've learned throughout this experience, what actionable advice would you like to leave for next year's 6th Grade Cohort to ensure our TMS Garden continues to improve?