



(2025)

PBL



TECHNOLOGY

/Tech & AI to Support PBL

@castschools

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A guide for teachers
of all experience levels.

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Technology & Blended Learning

Background

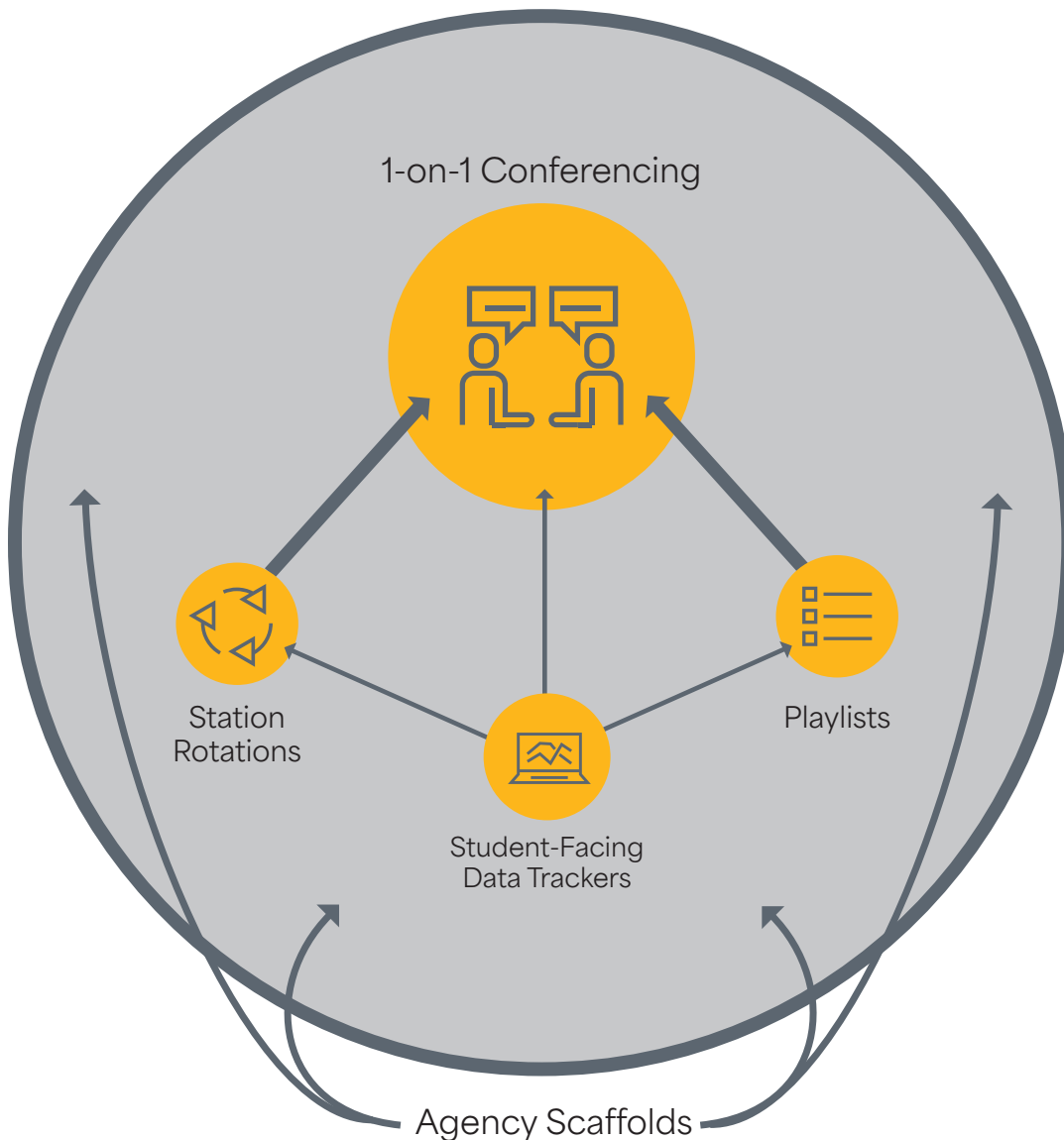
By integrating blended learning strategies—such as playlists, station rotations, student-facing data trackers, and structured one-on-one conferencing—CAST teachers have effectively empowered students to take ownership of their learning experiences. Through intentional scaffolding, regular reflection, and agency-focused tools, students develop critical self-regulation skills, enabling deeper engagement and more authentic learning outcomes. This approach not only strengthens student-teacher relationships but also ensures students are active, self-directed participants in their project-based classrooms.

Flipped Classroom

The Raising Blended Learners project incorporates elements of a flipped classroom by providing curated resources, activities, and direct instructional content for students to explore independently. This structure frees classroom time for meaningful collaboration, critical thinking, and deeper exploration of PBL topics. By flipping the traditional instructional model, this cultivates an environment that prioritizes student-led inquiry, interactive problem-solving, and authentic, project-driven learning experiences. It creates the time and space for teachers to work more 1-on-1 with students instead of spending the majority of their time leading whole-class learning through direct instruction. This environment is ideal for the demands of Project Based Learning.

Framework

In Project Based Learning, engaging in core blended learning strategies (station rotations, playlists, and student-facing data trackers) supports the implementation of regular 1-on-1 conferencing, which builds the student-teacher relationships of safety and trust needed for students to be vulnerable, reflect, challenge themselves, and grow. All of this occurs with intentional background scaffolding focused on supporting student agency.



1-on-1 conferencing is at the core of blended learning. In order to facilitate 1-on-1 conferencing, teachers can use station rotations, playlists, and data trackers to allow students to progress through learning independently. All of this requires agency supports and scaffolding to help students activate their own agency and operate in a student-led environment.

Harness AI to Build PBL



Emily, a teacher brand new to Project-Based Learning, felt overwhelmed by the thought of designing her first PBL unit on environmental conservation. Uncertain where to start, she turned to ChatGPT, inputting her curriculum objectives. Within minutes, ChatGPT generated engaging project ideas, essential driving questions, and an organized project outline. Feeling empowered by this starting point, Emily quickly refined these materials to fit her classroom context. With much of the initial planning complete, she now felt more confident and excited to guide her students through their first authentic, engaging project.

Helpful AI Tools to Support Your PBL Journey

- **ChatGPT (OpenAI)** - Brainstorm project ideas, generate engaging driving questions, and quickly create rubrics or outlines.
- **Canva AI** - Automatically design project visuals, presentations, and instructional materials.
- **Curipod** - AI-powered lesson plan and project idea generator tailored for educational contexts.
- **Eduaide.AI** - Create differentiated tasks, scaffolding materials, and formative assessments instantly.



Opportunities that AI Tools Provide

- Rapid brainstorming and ideation, turning your curriculum objectives into meaningful, engaging projects.
- Efficient creation of project outlines, rubrics, and evaluation criteria.
- Increased time to focus on student interaction, feedback, and personalized instruction.
- Reduced preparation time, allowing more focus on student-centered learning and classroom dynamics.



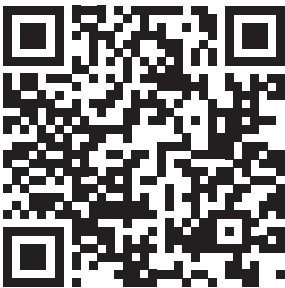
Cautions to Keep in Mind

- Always review AI-generated content for accuracy and appropriateness before classroom use.
- AI tools should supplement—not replace—teacher judgment, creativity, and expertise.
- Be mindful of student privacy and data security when integrating AI-powered tools.
- Regularly assess and adjust AI-generated materials to align with your specific educational standards and student needs.



See a ChatGPT PBL Planning Chat Generated by a Teacher

Scan or Click



make me a pbl with the following standards: (6) Science concepts. The student understands the development of atomic theory and applies it to realworld phenomena. The student is expected to:

(A) construct models using Dalton's Postulates, Thomson's discovery of electron properties,

Rutherford's nuclear atom, Bohr's nuclear atom, and Heisenberg's Uncertainty Principle

to show the development of modern atomic theory over time; (B) describe the structure of atoms and ions, including the masses, electrical charges, and locations of protons and neutrons in the nucleus and electrons in the electron cloud;

(C) investigate the mathematical relationship between energy, frequency, and wavelength of light using the electromagnetic spectrum and relate it to the quantization of energy in the emission spectrum;

(D) calculate average atomic mass of an element using isotopic composition; and

(E) construct models to express the arrangement of electrons in atoms of representative elements using electron configurations and Lewis dot structures.

Here's a Project-Based Learning (PBL) activity that aligns with these standards and engages students in a comprehensive exploration of atomic theory.

PBL Title: The Atomic Evolution: Tracing the Atom from Theory to Reality

Driving Question



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Driving Question

How has our understanding of the atom evolved over time, and how does this knowledge impact the modern world?

Project Overview

Students will embark on a journey through the history of atomic theory, creating models and engaging in hands-on activities to represent key discoveries and advancements. They will explore the structure of atoms and ions, the relationships within the electromagnetic spectrum, and calculate atomic masses. By the end of this project, students will produce a timeline exhibit that explains the development of atomic theory and showcases how this understanding applies to modern scientific and technological phenomena.

Project Phases

Phase 1: Atomic Theory Timeline

- **Objective:** Construct models representing each stage of atomic theory development, including Dalton's Postulates, Thomson's electron discovery, Rutherford's nuclear atom, Bohr's atomic model, and Heisenberg's Uncertainty Principle.

Activities:

- Research each model and the scientist(s) responsible.
- Create a physical or digital model of each concept.
- Present each model in a timeline format, with explanations of how each discovery influenced the next.

Phase 2: Exploring Atomic Structure

- **Objective:** Describe the structure of atoms and ions, focusing on the masses, charges, and locations of protons, neutrons, and electrons. ↓

ChatGPT Prompt Stems for PBL



Prompts for Planning a PBL:

- “Generate a list of engaging driving questions for a PBL about [topic].”
- “Create a detailed project timeline for a three-week project on [topic].”
- “Suggest real-world challenges related to [topic] suitable for middle school students.”
- “Outline key project milestones for students working on [topic].”
- “List community resources that could support a PBL on [topic].”

Prompts for Building Tools/Guides to Support PBL:

- “Create a student-friendly guide explaining how to conduct interviews with experts.”
- “Draft a checklist for students to self-manage their project tasks.”
- “Develop a graphic organizer to help students brainstorm solutions to [problem].”
- “Design a template for students to document their project reflections weekly.”
- “Generate instructions for a peer feedback session on student projects.”

Prompts to Help Troubleshoot Issues That Arise with Students:

- “Suggest strategies to engage students struggling with teamwork.”
- “Provide ideas to support students who find open-ended tasks overwhelming.”
- “List tips to improve student motivation mid-project.”
- “Recommend techniques for helping students overcome communication barriers.”
- “Generate strategies to help students manage their project timelines effectively.”

Prompts to Help Differentiate:

- “Suggest ways to modify a [topic] project for English language learners.”
- “Create scaffolding activities to support students with different learning needs during [topic].”
- “Provide enrichment tasks for advanced students participating in a project on [topic].”
- “Offer ideas for differentiating final products in a PBL focused on [topic].”
- “List strategies for adapting group roles to ensure equity and

inclusion.”

Prompts to Create Playlists or Stations:

- “Design a series of station activities related to [topic].”
- “Outline an independent learning playlist for exploring [topic].”
- “Develop a set of self-paced tasks that guide students through [topic].”
- “Generate ideas for digital learning stations focused on [topic].”
- “Create a thematic playlist of videos and resources for student exploration of [topic].”

Prompts to Support Student Reflection:

- “Write reflection questions for students completing a project on [topic].”
- “Develop prompts for journal entries tracking student progress in [topic].”
- “Suggest reflective discussion questions for student project debrief sessions.”
- “Generate a reflection sheet template students can use post-project.”
- “Create peer-assessment prompts for reflection on teamwork during [topic].”

Prompts to Create Rubrics:

- “Generate a rubric for evaluating student presentations about [topic].”
- “Draft a clear and student-friendly rubric for assessing teamwork.”
- “Provide a rubric outline for a creative project about [topic].”
- “Create a rubric to evaluate

student research and inquiry skills.”

- “Design a rubric focused on assessing student innovation and originality.”

Prompts to Generate Ready-to-Use Classroom Activities:

- “Suggest a hands-on activity introducing students to [topic].”
- “Create a classroom debate outline on the topic of [issue].”
- “Develop a problem-solving activity suitable for group work on [topic].”
- “Design an engaging introductory hook activity for a project on [topic].”
- “Generate ideas for interactive classroom simulations about [topic].”

Prompts to Assist in Assessment:

- “Suggest formative assessment strategies for monitoring student progress during [topic].”
- “Provide creative summative assessment ideas for a unit on [topic].”
- “Develop a quick formative check-in activity to assess understanding of [topic].”
- “Generate student self-assessment prompts for evaluating learning outcomes.”
- “Outline assessment criteria for student-led presentations on [topic].”