Designing a Problem-Based Enhanced Language Learning (PBELL) Lesson

PBELL
Problem-Based Enhanced Language Learning

- Meaningful problem rooted in content and language standards
- Evaluation of content and language
- Inquiry incorporating language instruction and supports
- Solution development and sharing incorporating language instruction and supports
- Collaboration incorporating language instruction and supports

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Arizona State University
January 2020
What is PBELL?

Educators, at times, may feel underprepared to meet the unique needs of the ever transforming diverse student population in the United States. The introduction of the Common Core State Standards (CCSS) in 2009 demanded an increase in rigor in classrooms across the country (National Center for Education Statistics, 2017). This increase in rigor is not only placed on educators, but also on the demands placed on students as they work to master both content and skills.

Language, and its role in a learner’s ability to both process and acquire knowledge and skills, is an essential factor in our ability to support the needs of diverse learner populations. Historically, language development has been relegated to the study of formal language (e.g. sentence patterns, grammatical rules, parts of speech, etc.). These elements of language are often seen as being separate from content, resulting in English Language Learners (ELLs) not having the opportunity to effectively learn content and practice skills. Content areas must move towards a deliberate and focused emphasis on language development by supporting learners in acquiring both content and language in tandem.

One way to support educators as they work to implement these changes is through Problem-Based Enhanced Language Learning (PBELL). The PBELL approach was developed at Arizona State University to ensure students access to both language and content as they explore real-world problems. Combining the researched-based structure of Problem-Based Learning with an intentional planning for language, this approach guides students to collaboratively solve meaningful problems in their community while learning content. Students work collaboratively to research information and develop a solution, with multiple student perspectives driving the learning. PBELL elevates the role of language by supporting educators in explicitly teaching language and creating authentic, collaborative, and inquiry-based practice for students. PBELL is broken into 5 components: 1) Meaningful Problem, 2) Inquiry, 3) Collaboration, 4) Solution- Development & Sharing, and 5) Assessment. Each of these components can be found in conventional PBL lessons; however, what distinguishes PBELL from PBL is the intentional focus on language. Each component includes the strategic planning for acquisition and use of language skills. PBELL ensures that all students have access to all content.
<table>
<thead>
<tr>
<th>Teacher:</th>
<th>Grade/Subject:</th>
</tr>
</thead>
</table>

### Title of Experience/Topic:

#### Meaningful Problem (framing words + person + action + audience[^1]):

- Relevant to students, school, or community
- Require new learning/ additional information
- Allows for multiple solutions

**How will I introduce the problem to them?**
(movie, letter from the principal, book, experience, field trip, pictures, etc…)

**Time Frame:** (number of sessions and length of sessions)

**Content Standard(s):**

**Integrated Language Standard(s) (reading, writing, speaking, listening):**

- Assessed
- Not Assessed

**Content Language Objective (Language Function + Content Stem + Supports[^2]):**

Students will be able to...

**How will students share out the solution?**

**Materials:**

**Vocabulary taught prior to the experience (Background):**

**Vocabulary developed during lesson:**
### Academic Language:
What language function is most relevant to your PBELL (i.e. argumentation, cause and effect, justification, etc.)? How will this language be explicitly taught, applied, and practiced during the PBELL?

### Creating the Experience (Inquiry):
How will students gather the new information needed to solve the problem (i.e. research stations, experts, websites, etc.)? How is language being incorporated in inquiry (reading, writing, listening, and/or speaking)? What content and language supports will be used (i.e. sensory, graphic, interactive)?

### Creating the Experience (Solution Development and Sharing):
How will students work together to develop and present solutions? What skills do students need to be able to present the solution and how will they be explicitly taught? How is language being incorporated in solution development and sharing (reading, writing, listening, and/or speaking)? What content and language supports will be used (i.e. sensory, graphic, interactive)?

### Evaluate:
When and how will you use formative and summative assessments to measure student progress and learning (content and language)?
Meaningful Problem

In a PBELL experience, all learning starts with the introduction of a meaningful problem. This problem, whether real or simulated, gives the content and new learning an authentic context, making it more meaningful for students. It is connected to the students, their school, or their community.

In one classroom, the meaningful problem might be the overproduction of waste on campus. Students would work together to design a solution to the recent increase in waste due to a new breakfast in the classroom initiative. In this real experience, students are accomplishing tasks related to a problem connected to their school. All content and language learning would move students towards developing a solution. In another classroom, students might take on the role of non-profit representatives tasked with designing a solution to the many problems refugee camps face. In this simulated experience, students are accomplishing tasks related to a problem connected to their community.

The meaningful problem, whether real or simulated, drives the learning. Each learning task is designed to help students gather the new information required to solve the problem and organize that information so that it can be used to design a solution. Each problem allows for multiple possible solution paths, allowing students the freedom to explore and engage in the new learning. Meaningful problems connect the problem to the students, their school, and their community, ensuring that new information is required to solve the problem, and allow for multiple solutions.

Meaningful Problems must...

➢ be relevant to students, school, or community
➢ require new learning/ additional information
➢ allow for multiple solutions

One resource to help develop a meaningful problem in the form of a Driving Question is PBL Works TUBRIC (Buck Institute for Education, n.d.).

How can our class solve the problem of waste at our school?
Let’s Practice! Meaningful Problem

You can start with a problem you think is relevant to your students or start with a standard to create your driving question!

Meaningful Problem Criteria:
➢ Relevant to students, school, or community
➢ Requires new learning/ additional information
➢ Allows for multiple solutions

History: Cycles of conflict and cooperation have shaped relations among people, places, and environments.

1.H2.1 Explain the benefits of cooperation and compromise as ways to resolve conflict in communities past and present. (CCSS, 2020)

Practice writing a driving question. Choose either the standard or the image above and write a PBELL problem using the TUBRIC. Try both!

(Buck Institute for Education, n.d.)
Consider how you will get students engaged in the problem. How will you hook them, grab their attention, and make them interested in finding a solution?

- **Pictures**
- **Books, Magazines**
- **Videos & Websites**
- **Hands-on Experiences**
- **Statistics**
- **News**
Standards

Identify content standards that will be met as students inquire into the problem, develop a solution, and share the solution with an audience. In thinking about the language standards you use (reading, writing, listening, and speaking), reflect on how students will use language to explore the problem and develop and share their solutions.

To enhance language learning, all PBELLs should incorporate reading, writing, listening, and speaking throughout the experience.

Meaningful Problem

How can we make a plan to meet the food needs at our 5th grade graduation party?

(sample standards that align to problem below)

Content

CCSS.MATH.CONTENT.5.NF.B.6
Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. (CCSS, 2020)

Listening & Speaking

CCSS.ELA-LITERACY.SL.5.4
Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. (CCSS, 2020)
Language functions refer to how students use language to make meaning of the content and communicate their ideas with others. One resource you can use is the Academic Language Function Toolkit. It offers various language functions that align to all content areas, along with sentence stems, graphic organizers and various activities to support students’ use of language.

<table>
<thead>
<tr>
<th>Sensory Supports</th>
<th>Graphic Supports</th>
<th>Interactive Supports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-life objects (reals)</td>
<td>Charts</td>
<td>In pairs or partners</td>
</tr>
<tr>
<td>Manipulatives</td>
<td>Graphic organizers</td>
<td>In triads or small groups</td>
</tr>
<tr>
<td>Pictures &amp; photographs</td>
<td>Tables</td>
<td>In a whole group</td>
</tr>
<tr>
<td>Illustrations, diagrams, &amp; drawings</td>
<td>Graphs</td>
<td>Using cooperative group structures</td>
</tr>
<tr>
<td>Magazines &amp; newspapers</td>
<td>Timelines</td>
<td>With the Internet (websites or software programs)</td>
</tr>
<tr>
<td>Physical activities</td>
<td>Number lines</td>
<td>In the native language (L1)</td>
</tr>
<tr>
<td>Videos &amp; films</td>
<td></td>
<td>With mentors</td>
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<tr>
<td>Broadcasts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Models &amp; figures</td>
<td></td>
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</tbody>
</table>

Now you try! In an upcoming lesson students will be learning about calories, junk food, and healthy choices. They will be presenting this information to their school. Write a content language objective for this lesson.
How will students share out the solution?

Consider the end product. How will students share their solutions with an authentic audience?

- Oral Presentation
- Diagram/Blueprint
- Podcast
- Blog
- Writing
- Diorama
- Prototype
- Video
Language

The learning is designed so that students are developing and utilizing reading, writing, speaking, and listening skills. While conducting inquiry, solution development, and solution sharing, students will potentially need to summarize text, paraphrase expert interviews, and organize the notes from their research or experiment. All of these are language skills that must be explicitly taught and practiced. Additionally, students will need to share their new learning with their peers as they work together to address the meaningful problem.

The new learning and experiences include strategic support to help all learners succeed. Specifically three types of supports are used:

🌟 Interactive - students are strategically placed together in the inquiry process to support one another’s learning. This could include small groups, pairs, or partners intentionally grouped together based on their primary language. Students may read and gather information together or pair up after the inquiry process to share the new learning they have discovered.

🌟 Graphic - charts, tables or graphic organizers are used to help students understand new ideas and organize their new learning. During the inquiry phase, students may use a KWL graphic organizer to organize their new learning. They would brainstorm what they already know about the topic related to the meaningful problem, then as a class they may form questions to represent what they want to know. These questions would then drive the inquiry experience and students would note the new learning they discover related to the questions in the Learn column.

🌟 Sensory - manipulatives, visuals, video, and real-world objects are used throughout the inquiry process to ensure that all students have access to new learning. Teachers can bring in real-world items to support student learning and understanding. In a “Reducing Waste” PBELL, the teacher brought in items that could and could not be recycled and allowed students to examine, hold, sort, and question the items. (WIDA Consortium, 2012)

Academic Language

How do we explicitly teach language you ask?

Students will justify their process for solving a math problem by multiplying fractions using visual models, a graphic organizer, and cooperative group structures for conversation.

The language of justification, as described in the content language objective above was taught as follows:

- Creating a T chart with students with the questions “What does justification mean? look like? sound like?”
- Practice with partners using justification language with a simple idea. ie: How would you justify to your parents the purchase of a new backpack?
- Continue practicing justification with a simple math problem
- Practice in lesson with sentence stems.

What language function is most relevant to your PBELL (i.e. argumentation, cause and effect, justification, etc.)? What language will students need to explore the problem and present the solution. How will this language be explicitly taught, applied, and practiced during the PBELL?
Collaboration (embedded throughout inquiry and solution)

Collaboration

Students work collaboratively in a PBELL experience. Collaboration takes place during the inquiry process, during the solution development phase, and/or during the solution sharing phase. Collaboration will look differently in each PBELL but students should always have the opportunity to meaningfully work with one another. To support collaboration, students engage in reciprocal conversations. This means students build on one another’s ideas, question their peers, and provide feedback. They are encouraged to respond flexibly using multiple linguistic resources (i.e. home language, social language, etc), allowing students to learn from one another.

As discussed in the inquiry section, to support the development and use of these skills, teachers use graphic, sensory, and interactive supports to shelter the experience. As students learn how to build on one another’s ideas, sentence stems can be used to support conversation. Additionally strategic grouping can be used to ensure students can support one another’s idea development.

Language Skills must be explicitly taught. If you want students to collaborate you must give them the tools they will use to do so… this could include:
- Argumentation (see example lesson below)
- Disagree/agree
- Elaborate
- Expand on ideas

Language Skill Lesson

Lesson: Pro-Con Improv (Zwiers, 2017)

“The purpose of this lesson is to build students’ argumentation skills in preparation for debates, structured academic controversies, discussions, and argument-based written and multimedia products.”

Pro-Con Improv (Zwiers, 2017)

1. Form pairs- Director claps and says “pro”
2. The speaker shares positive aspects of the topic
3. Director claps and says “con!”
4. Speaker uses academic transition from the board and shares negative aspects. Director gives feedback on which pro/con was best defended
5. Switch roles with new topic

Structures and Supports for Conversation

➔ Think-Pair-Share
➔ Round Robin
➔ Gallery Walk
➔ Talking Chips
➔ Conversation paired protocol
➔ Graphic Organizer
➔ Sentence Stems
Creating the Experience (Inquiry)

**Inquiry**

While a meaningful problem drives the learning, inquiry is truly at the heart of a PBELL. High quality inquiry ensures that a PBELL is a meaningful, content-focused learning experience not simply a “cherry-on-top” project at the end of a unit. The meaningful problem is the foundation for the gathering of new information. Students gather new information through in-depth inquiry which can take many forms. Students can collect new information by interviewing experts on the topic, attending related field trips, and engaging in presentations/assemblies. Building on the “Reducing Waste” example started above, the teacher might contact the city’s recycling company and invite an expert to be interviewed by students. Additionally, students can gather new information through research using books, articles, websites, and documentaries. For example in the simulated refugee example above, to learn more about the current state of refugee camps, the teacher might create research stations which include a short documentary on a specific camp, a set of articles written in the last two years by journalists, and parts of book written about the camps from the perspective of a refugee. In subjects like English language arts and social studies inquiry is often conducted as research and follows the sequence outlined above, whereas in math and science, inquiry is often conducted as a student-centered experience. Students may gather new information through a series of experiments or use visual representations to solve the meaningful problem presented to them.

How will students gather the new information needed to solve the problem (i.e. research stations, experts, websites, etc.)? What content supports will be used (i.e. sensory, graphic, interactive)?

- **Expert**
  - Field Trip
  - Interview

- **Resource**
  - Books
  - Website
  - Video

- **Exploration**
  - Experiment
  - Visual modeling

Research stations (like these) are an excellent way to provide students with multiple forms of inquiry.
How is language being incorporated in inquiry (reading, writing, listening, and/or speaking)? What language supports will be used (i.e. sensory, graphic, interactive)? What language skills will students need to inquire into the problem?

- **Interview** - generate questions, practice paraphrase skills, paraphrase information from interview.

- **Kids Books (immigration)** - summarize the effects of immigration on students using picture books.

Use the graphic organizer below to brainstorm ways your students can inquire into the problem, the skills needed, and the supports you plan to provide.
Creating the Experience (Solution Development)

Developing a Solution to Share

Once students have gathered new information through inquiry, they organize the information and use it to guide the development of a solution. This solution is then shared with an authentic audience. For example, the students researching the solution to campus waste may share their solution with the school principal. The principal would be the best audience to ensure they are able to implement their solution with the student body. Each group’s presentation will include a powerpoint and oral presentation. Alternatively, student groups researching ways to enhance the refugee camps may share their solutions in a series of professional letters that will be sent to the United Nations.

As students develop and share their solutions, they use discipline specific language or language that is intentionally designed to support the content they are researching. The discipline specific language is explicitly taught and practiced throughout the PBELL experience (i.e. the language of argumentation in science). In the “Reducing Waste” example above, students were explicitly taught the language function of summarizing. They were researchers and it was important that they narrowed their research down to the most important facts and figures that would guide their solution development. Students practiced orally summarizing information from a video and paraphrasing that information on their note-taking sheet. As students gathered new information through research stations, they paused frequently to summarize new facts and ideas with their research partners. In each part of the lesson, sentence stems and graphic organizers were used to help students narrow down the most important information they gathered.

How will students use the information they gathered in the inquiry phase to develop a solution? How will students work together to develop solutions? What content language supports will be used (i.e. sensory, graphic, interactive)?

How can students develop solutions?

<table>
<thead>
<tr>
<th>Text Evidence</th>
<th>What I Know</th>
<th>Inference</th>
</tr>
</thead>
</table>

Sticky Note Brainstorming

Consensus Maps

Guided Graphic Organizers

Inquiry on Solutions

Create
Evaluate
Apply
Creating the Experience (Solution Development)

How is language being incorporated in solution development (reading, writing, listening, and/or speaking)? What language supports will be used (i.e. sensory, graphic, interactive)?

Communication skills to consider when planning for solution development

- **Brainstorming** potential solutions
- **Academic Conversations** with peers to determine the best solution or implement solution

Use the graphic organizer below to brainstorm ways your students can develop solutions to the problem, the skills needed, and the supports you plan to provide.

```
Developing a Solution to the Problem

How will students collaborate to develop solutions to the problem?
What skills do students need to develop solutions to the problem?
What supports are in place (both content and language) to help students develop solutions to the problem?
```
Creating the Experience (Solution Sharing)

Many ways to share a solution were given earlier in the guide. The following is an example of how you may plan for the skills needed so students may be successful in sharing their solutions with an authentic audience.

In order for my students to be successful in sharing their solution through a podcast, I must prepare them with the **output language skills** they will need.

### Practice: Using provided Handout brainstorm the speaking and writing skills you would need to teach for your identified Solution Sharing option.

<table>
<thead>
<tr>
<th>Language Skill (Speaking)</th>
<th>Language Skill (Writing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill: How could it be taught/practiced?</td>
<td>Skill: How could it be taught/practiced?</td>
</tr>
<tr>
<td>Skill: Pausing and Tone</td>
<td>Skill: Language of Inferring (script)</td>
</tr>
<tr>
<td>How could it be taught/practiced?</td>
<td>How could it be taught/practiced?</td>
</tr>
<tr>
<td>Model pausing at commas and stopping at periods. Model emphasizing different words and discuss impact on meaning.</td>
<td>Using Phoenix as a model. The teacher will model describing the problem and using the language of inferring to describe potential risks.</td>
</tr>
<tr>
<td>Students practice with example sentences.</td>
<td>Students will apply to their own work using sentence stems and cue words</td>
</tr>
</tbody>
</table>

How will students share their solution? What skills do students need to be able to present the solution and how will they be explicitly taught? How is language being incorporated in solution sharing (reading, writing, listening, and/or speaking)? What content and language supports will be used (i.e. sensory, graphic, interactive)?
**Assessment**

Just like any other learning structure, PBELL is strategically designed with pre-identified content and language objectives which allow for multiple pre-planned assessment opportunities. These formative and summative assessments allow teachers to determine what skills students have mastered and which skills need additional support. Students are evaluated on many factors such as: communication, collaboration, creativity, content learning, inquiry skills, problem solving, and research skills. Additionally, students are evaluated on their use of discipline specific language.

<table>
<thead>
<tr>
<th>Types of Assessments</th>
<th>Content</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams</td>
<td></td>
<td>Checklists</td>
</tr>
<tr>
<td>Quizzes</td>
<td></td>
<td>Rubrics</td>
</tr>
<tr>
<td>Exit Tickets</td>
<td>WIDA</td>
<td>SOLOM</td>
</tr>
<tr>
<td>(WIDA, 2020)</td>
<td></td>
<td>(SOLOM, 2020)</td>
</tr>
<tr>
<td>Checklists</td>
<td>Teacher</td>
<td>Created</td>
</tr>
</tbody>
</table>

When and how will you use formative and summative assessments to measure student progress and learning (content and language)?

Look at how this sample summative assessment measure both content knowledge (math) and students use of language.
Evaluate

Check out these sample rubrics from a unit on reducing waste. Remember you can evaluate language skills, content skills, collaboration, problem solving, etc...

**Final Product Rubric - Applied to each individual within a group**

W2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers

K-2-ETS1-1 Engineering Design Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

(CCSS, 2020 & NGSS, 2020)

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Language of Summarizing</strong></td>
<td>Information from sources is paraphrased (student's words)</td>
<td>Information from sources is paraphrased (student's words)</td>
<td>Some information is paraphrased other information is taken from author</td>
<td>Students do not use the language of summarizing</td>
</tr>
<tr>
<td></td>
<td>Summarizing vocabulary used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Use of Data and Facts</strong></td>
<td>7 or more facts/ data points used in solution</td>
<td>7 or more facts/ data points used in solution</td>
<td>Some facts/ data points used in solution</td>
<td>Data/Facts are missing or may not be accurate</td>
</tr>
<tr>
<td></td>
<td>Facts are true</td>
<td>Facts are true</td>
<td>Facts are true</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Source is referenced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facts support solution choice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Presentation</strong></td>
<td>Oral- clear, confident voice is used. Able to answer questions knowledgeably</td>
<td>Oral- clear, confident voice is used. Able to answer some questions knowledgeably</td>
<td>Oral- includes oral presentation</td>
<td>No oral presentation and/or no product submitted</td>
</tr>
<tr>
<td></td>
<td>Product- done in a published form (not rough draft), minimal spelling and grammar mistakes, use of pictures and tools)</td>
<td>Product- done in a published form (not rough draft submitted)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Inquiry Checklist**

**Writing - W 2.8**

Recall information from experiences or gather information from provided sources to answer a question

(CCSS, 2020)

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Uses Read-Cover-Write Strategy</th>
<th>Paraphrases on note taking section</th>
<th>Can explain what a paraphrase on their sheet means</th>
<th>Summarizes learning connected to Meaningful Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

**Collaboration Rubric**

Ideally a collaboration rubric would be student created. Here is an example of what an end-product might look like

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>****</td>
<td>Shares ideas</td>
<td>Shares ideas</td>
<td>Shares ideas</td>
<td>Does not participate and/or off-task most</td>
</tr>
<tr>
<td></td>
<td>Listens to peers</td>
<td>Listens to peers</td>
<td>Listens to peers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stays focused</td>
<td>Stays focused</td>
<td>Stays focused</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paraphrases or extends peer ideas</td>
<td>Paraphrases or extends peer ideas</td>
<td>Paraphrases or extends peer ideas</td>
<td></td>
</tr>
</tbody>
</table>

| | Paraphrases or extends peer ideas | Paraphrases or extends peer ideas | Paraphrases or extends peer ideas |  |

| | Paraphrases or extends peer ideas | Paraphrases or extends peer ideas | Paraphrases or extends peer ideas |  |

| | Paraphrases or extends peer ideas | Paraphrases or extends peer ideas | Paraphrases or extends peer ideas |  |

| | Paraphrases or extends peer ideas | Paraphrases or extends peer ideas | Paraphrases or extends peer ideas |  |


