### Problem Based Pedagogy

**Definition:** A student centered context-specific approach to learning which engages students in real-world challenges similar to those they might encounter as a practitioner of a specific discipline. These challenges are usually present in the form of cases to be studied rather than specific problems to be solved. There is rarely a right or wrong answer but rather solutions based on the knowledge necessary to address the issue.

**Application:** Through a process of discussion and research, students identify a selection of questions that might be workable for their project, work on solutions, and publish those solutions online.

**Implementation:** *Students assume a major responsibility for their own learning and teachers are facilitators.*

*Learning occurs in small groups and collaboration is emphasized.*

**Goal:** Students gain meaningful skills through these projects, including how to share work, collaborate, organize, and express themselves more effectively.

PBL emphasizes solving complex problems in rich contexts and aims at developing higher order thinking skills.

### Place Based Pedagogy

**Definition:** It is an educational approach which uses local community and the surrounding environment as the primary context for interdisciplinary learning. It focuses on student-driven, project-based explorations of local issues, including environmental, social, cultural, and civic.

**Application:** It is characterized by interdisciplinary learning, team teaching, hands-on learning experiences that often center on problem-solving projects, learner-centered education that adapts to students’ individual skills and abilities, and the exploration of the local community and natural surroundings.

**Implementation:**

- What are four or five overarching questions might guide your students’ study?
- How will you assess student learning? (Possible strategies and projects)
- What field studies, monitor, or other inquiry activities might students become involved in?
- What community needs might students address as part of this unit or project?
- How can they participate in data gathering, reporting, etc...?
- What creative possibilities relate?

**Goal:** The goal is to become more aware and conscious of the community or “place” and focusing educational components on that place (Nespor, 2008).

Engage students in how global challenges impact their place.
| Understanding by Design Framework | A framework for teaching that works within standards-driven curriculum which helps teachers clarify the goals, devise assessments which are effective measures of student understanding, and engage students in learning activities. It works on a 3 stage design process called "backward design" which starts with the end in mind and delays the planning of activities until the goals have been clarified and assessments designed. | Teachers are coaches of understanding, not mere purveyors of content or activity. Focus on ensuring learning, not just teaching. Aim and check for successful meaning making and transfer by the learner. | Three stages:  
Stage 1 - Identify Desired Results  
- Goals  
- Essential questions  
- Knowledge and skills  
Stage 2 - Determine Acceptable Evidence  
- Performance products  
- Criteria assessed  
- Alignment  
Stage 3 - Plan Learning Experiences and Instruction Accordingly  
- Activities, experiences, and lessons  
- Learning plan  
- Progress Monitoring  
- Unit sequence  
- Alignment  | To develop and deepen student understanding- the ability to make meaning of learning via “big ideas” and to transfer learning. |
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| Quantitative Reasoning | Is the application of mathematical concepts to solve real-world problems where students learn to apply basic quantitative skills to the devise solutions. QR is a skill that students learn that has practical applications. | Framework includes four key components:  
1. Quantification Act (QA): Mathematical process of conceptualizing an object and an attribute of it so that the attribute has a unit measure.  
2. Quantitative Literacy (QL): Use of fundamental mathematical concepts in sophisticated ways for the purpose of describing, comparing, manipulating, and drawing conclusions from variables developed in the quantification act.  
3. Quantitative Interpretation (QI): Ability to use models to discover trends and make predictions.  
4. Quantitative Modeling (QM): Ability to create representations to explain a phenomenon and to revise them based on fit to reality. | -Begin with a problem (task) which needs to be specified and should lead to the construction of a working model.  
-This model needs to be tested and tried and if needed re-designed.  
-Finally, students need to elaborate the important ideas behind their model and data.  
*Students need to understand the quantities themselves and visualize that their images include values that vary. They need to form a representation of the "object made by uniting those quantities in thought and maintaining that unit while also maintaining a dynamic image of the situation in which it is embedded" (Thompson 2011, p. 27).  
To align classroom activities with how scientists in the real world work  
The development of a model to offer explanation for the situation under investigation |
<table>
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<tr>
<th>Modes of Reasoning</th>
<th>Approach problem-solving from various directions. Some use the scientific method, or engineering design, where others use inductive or deductive reasoning. Helping develop innovative interdisciplinary teaching and learning strategies.</th>
<th>The three main modes of reasoning to be focused on include quantitative reasoning, scientific method, and engineering design.</th>
<th>When students get stuck in problem solving they can be asked to consider the problem a different perspective. For example, some will begin with the problem whereas others will begin with the desired solution.</th>
<th>To help students think creatively and outside of their one world view and to learn that different approaches can be used to get to the desired result.</th>
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<tr>
<td>Learning Progression</td>
<td>Learning progressions represent a framework for helping to bridge the gap between how people think and how people learn. They focus on a student’s ability to understand and use knowledge in increasingly more sophisticated ways over time.</td>
<td>Offers a coherent starting point for thinking about how student develop competence in an academic domain and how to observe and interpret the learning as it unfolds</td>
<td>1) eliciting evidence about learning to close the gap between current and desired performance; 2) providing feedback to students; and 3) involving students in the assessment and learning process. Learning progressions are foundational to these elements (Heritage, 2008)</td>
<td>The goal of a learning progression is to require the student to think in an ever increasingly sophisticated way, encouraging dialogue rather than just answering a question.</td>
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