Spring 4-26-2019

Project Based Learning Course Integration for Elementary Science Methods

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1. **PBL Assignment Summary Description (from Syllabus)**

    4. **PBL Project (30%)** Driving Question for this assignment: Why and how should elementary teachers engage students in Project Based Learning (PBL) in their future classroom? This project is the major course assignment. You will decide whether to work individually or with another classmate (preferred) in completing the assignment. You will focus on a specific grade level, develop a rationale for the effective use of Project Based Science at this grade level, and create a PBL project that can be integrated into your future classroom.

    (1) Rationale (40 pts). Your rationale should justify the use of PBL in your future elementary classroom based on a) learning goals, b) student engagement, c) management style, d) classroom arrangement, e) assessment, f) community resources, g) material materials and artifacts, h) communicating with parents and colleagues. Due on 4/22.

    (2) Project (60 pts). Your project description should include brief descriptions of examples of at least two (2) effective PBL projects for your selected grade level. Projects can be year-long or semester-long to support depth of involvement. Besides the above, students working in pairs, should provide a full description of a PBL project for your selected grade level including necessary logistics for integrating the project your curriculum. You will provide a summary presentation of your project at the last class. Due by **week 10** (6/10).
1. Course Syllabus

College of Education  
EELB 532 – Spring 2019  
Monday 5:00-8:50 (IW 206)

Science/Health Curriculum and Pedagogy in Elementary School

Instructor: Dr. William Dwyer
Office: RG 213
Phone: (760) 218-9422
Email: william.dwyer@csusb.edu (Please put EELB 532 in message subject line)
Office Hours: By appointment
TEF Dept: (909) 537-7405

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Wise Educator Statement
The College of Education at California State University, San Bernardino (CSUSB) is dedicated to the
development and support of wise, reflective professional educators who will work towards a just and
diverse society that embraces democratic principles. Thus, the wise teacher:

- Possesses rich subject matter knowledge.
- Applies sound judgment to professional practice and conduct.
- Applies a practical knowledge of context.
- Respects multiple viewpoints.
- Wise educators reflect on professional practices and follow up with appropriate action.

(College of Education Conceptual Framework, 2006)

Catalog Description
Introductory course in curriculum and pedagogy in science and health. Emphasis on
implementing state adopted science and health curriculum standards in an elementary
classroom. Includes designing instruction to meet academic needs of all learners including
English language learners and learners with special needs. Formerly EELB 443. Student teachers
may take concurrently with EELB 533 or 534, 520D and 540B. Intern teachers may take concurrently with EELB 520 C and 560B. If not taken concurrently with EELB 540B or 560B, then six hours of fieldwork will be required.
Prerequisites: admission to the Multiple Subject Credential Program and completion of all
Phase I and II courses. (4 units)

Course Overview and/or Rationale
Instruction in science is fundamental to the development of all elementary school children. What
experience and knowledge do students bring to the science classroom? How do teachers assist elementary
children in doing science and understanding science concepts in a culturally relevant way? What classroom
conditions facilitate elementary children’s understanding in science? What methods can teachers employ
with elementary children to excite them about learning science? These are just a few of the questions we
will be addressing over the course of this semester. You will explore these ideas through experiencing
activities as a science learner, reading, writing and discussing ideas about elementary science teaching and
learning, practicing various teaching strategies and constantly reflecting on your teaching and learning experience.

Observation and participation in a public school elementary classroom will facilitate application of class readings, discussions, and activities in a practical setting.

**The major objectives of this course include helping you to:**

- clarify and refine your beliefs about teaching and learning inquiry-based science in elementary classrooms of diverse student populations;
- become aware of elementary children’s ideas in science and cultural background and consider how their ideas and cultural background influence their science learning;
- learn, practice and reflect upon various teaching strategies for elementary science in diverse settings;
- develop lesson plans for teaching the Next Generation Science Standards for diverse student groups that also support students’ literacy and mathematical skills;
- explore, discuss and develop ways of assessing student learning of inquiry-based science in diverse settings.

**Required Textbook**

*Elementary Science Methods: A Constructivist Approach, 6th Edition*

Author: Martin, David J.

Wadsworth Publishing Company

ISBN #: 978-1-111-30543-7

(There are several editions available from various sources. 4th or 5th editions are cleared for use in this course, however, the reading assignments listed in the syllabus correspond to the 6th edition. If you use an earlier edition, you are responsible for reading the appropriate chapter; therefore, pay attention to the chapter titles, not the chapter numbers.)

*Please bring your required textbook to each class for reflection and discussion purposes.*

**Relevant Professional Standards**

The *California Standards for the Teaching Profession (CSTP)* are organized around the six interrelated categories of teaching practice listed below. This course is designed to work towards professionalism in each of the six categories. See *Course Objectives* for specific CSTP’s.

1. Engaging and supporting all Students in Learning
2. Creating and Maintaining Effective Environments for Student Learning
3. Understanding and Organizing Subject Matter for Student Learning
4. Planning Instruction and Designing Learning Experiences for All Students
5. Assessing Student Learning
6. Developing as a Professional Educator

*All course work and products will be aligned with these science education standards:*

California Standards for the Teaching Profession (CSTP) (2009)


California Teaching Performance Expectations (2016)


The Next Generation Science Standards (NGSS)

California Science Standards
http://www.cde.ca.gov/pd/ca/sc/ngssintrod.asp

California Science Framework
http://www.cde.ca.gov/ci/sc/cf/

Program Standards Relating to Intern Pre-Service English Learner Content:
A. Candidates examine principles of educational equity, diversity, cultural and linguistic responsiveness and their implementation in curriculum content and school practices for all students. Candidates are prepared to effectively teach diverse students by increasing candidates' knowledge and understanding of the background experiences, home languages, skills and abilities of student populations; and by teaching them to apply appropriate pedagogical practices informed by sound theory and research that provide access to the core curriculum and lead to high achievement for all students.

B. Candidates learn and understand the importance of students’ family and cultural backgrounds, and experiences in planning instruction and supporting student learning. Candidates communicate effectively with parents and families.

C. Candidates acquire and demonstrate the ability to use initial, diagnostic, formative, and summative assessment information (including performance-based assessment) to identify students’ language proficiencies and to develop effective instruction that promotes students’ access to and achievement in the academic content standards. (e.g., development of content and language objectives, flexible strategic grouping, structured oral interaction).

D. Candidates learn how to differentiate instruction based upon their students’ primary language and proficiency levels in English, and considering the students’ culture, level of acculturation, and prior schooling.

E. Candidates understand and demonstrate the importance of structured oral interaction in building academic English proficiency and fluency.

F. Candidates learn how to use a wide variety of strategies for including English learners in mainstream curriculum, providing scaffolding, modeling, and support while maintaining access to academic content and providing opportunities for language development.

G. Candidates acquire the knowledge of and ability to teach English learners, including but not limited to Specially Designed Academic Instruction in English (SDAIE) methodology, language acquisition and English Language Development (ELD), as applicable to a multiple subjects, single subject content, or special education classroom.

TPE 1: Engaging and Supporting All Students in Learning - Elements
Beginning teachers:
1. Apply knowledge of students, including their prior experiences, interests, and social-emotional learning needs, as well as their funds of knowledge and cultural, language, and socioeconomic backgrounds, to engage them in learning. (I, P)

3. Connect subject matter to real-life contexts and provide active learning experiences to engage student interest, support student motivation, and allow students to extend their learning. (I, P)

4. Use a variety of developmentally and ability-appropriate instructional strategies, resources, and assistive technology, including principles of Universal Design of Learning (UDL) and Multi-Tiered System of Supports (MTSS) to support access to the curriculum for a wide range of learners within the general education classroom and environment. (P)

5. Promote students' critical and creative thinking and analysis through activities that provide opportunities for inquiry, problem solving, responding to and framing meaningful questions, and reflection. (P, A)

6. Provide a supportive learning environment for students' first and/or second language acquisition by using research-based instructional approaches, including focused English Language Development, Specially Designed Academic Instruction in English (SDAIE), scaffolding across content areas, and structured English
immersion, and demonstrate an understanding of the difference among students whose only instructional need is to acquire Standard English proficiency, students who may have an identified disability affecting their ability to acquire Standard English proficiency, and students who may have both a need to acquire Standard English proficiency and an identified disability. (P)

7. Provide students with opportunities to access the curriculum by incorporating the visual and performing arts, as appropriate to the content and context of learning. (P)
8. Monitor student learning and adjust instruction while teaching so that students continue to be actively engaged in learning. (P, A)

TPE 2: Creating and Maintaining Effective Environments for Student Learning - Elements
Beginning teachers:
2. Create learning environments (i.e., traditional, blended, and online) that promote productive student learning, encourage positive interactions among students, reflect diversity and multiple perspectives, and are culturally responsive. (I, P)
5. Maintain high expectations for learning with appropriate support for the full range of students in the classroom. (P)

TPE 3: Understanding and Organizing Subject Matter for Student Learning - Elements
Beginning teachers:
1. Demonstrate knowledge of subject matter, including the adopted California State Standards and curriculum frameworks. (P, A)
2. Use knowledge about students and learning goals to organize the curriculum to facilitate student understanding of subject matter, and make accommodations and/or modifications as needed to promote student access to the curriculum. (P, A)
3. Plan, design, implement, and monitor instruction consistent with current subject-specific pedagogy in the content area(s) of instruction, and design and implement disciplinary and cross-disciplinary learning sequences, including integrating the visual and performing arts as applicable to the discipline. (P, A)
4. Individually and through consultation and collaboration with other educators and members of the larger school community, plan for effective subject matter instruction and use multiple means of representing, expressing, and engaging students to demonstrate their knowledge. (I, P)
5. Adapt subject matter curriculum, organization, and planning to support the acquisition and use of academic language within learning activities to promote the subject matter knowledge of all students, including the full range of English learners, Standard English learners, students with disabilities, and students with other learning needs in the least restrictive environment. (P, A)
6. Use and adapt resources, standards-aligned instructional materials, and a range of technology, including assistive technology, to facilitate students’ equitable access to the curriculum. (I)
7. Model and develop digital literacy by using technology to engage students and support their learning, and promote digital citizenship, including respecting copyright law, understanding fair use guidelines and the use of Creative Commons license, and maintaining Internet security. (I, P)

TPE 4: Planning Instruction and Designing Learning Experiences for All Students - Elements
Beginning teachers:
1. Locate and apply information about students' current academic status, content- and standards-related learning needs and goals, assessment data, language proficiency status, and cultural background for both short-term and long-term instructional planning purposes. (P)
3. Design and implement instruction and assessment that reflects the interconnectedness of academic content areas and related student skills development in literacy, mathematics, science, and other disciplines across the curriculum, as applicable to the subject area of instruction. (I, P)
4. Plan, design, implement and monitor instruction, making effective use of instructional time to maximize learning opportunities and provide access to the curriculum for all students by removing barriers and providing access through instructional strategies that include: (P, A)
   - appropriate use of instructional technology, including assistive technology;
   - applying principles of UDL and MTSS;
   - use of developmentally, linguistically, and culturally appropriate learning activities, instructional materials, and resources for all students, including the full range of English learners;
   - appropriate modifications for students with disabilities in the general education classroom;
   - opportunities for students to support each other in learning; and
   - use of community resources and services as applicable.

6. Access resources for planning and instruction, including the expertise of community and school colleagues through in-person or virtual collaboration, co-teaching, coaching, and/or networking. (I, P)

7. Plan instruction that promotes a range of communication strategies and activity modes between teacher and student and among students that encourage student participation in learning. (P)

8. Use digital tools and learning technologies across learning environments as appropriate to create new content and provide personalized and integrated technology-rich lessons to engage students in learning, promote digital literacy, and offer students multiple means to demonstrate their learning. (I, P)

**TPE 5: Assessing Student Learning - Elements**
Beginning teachers:
1. Apply knowledge of the purposes, characteristics, and appropriate uses of different types of assessments (e.g., diagnostic, informal, formal, progress-monitoring, formative, summative, and performance) to design and administer classroom assessments, including use of scoring rubrics. (P, A)
2. Collect and analyze assessment data from multiple measures and sources to plan and modify instruction and document students' learning over time.
3. Involve all students in self-assessment and reflection on their learning goals and progress and provide students with opportunities to revise or reframe their work based on assessment feedback. (I)

**TPE 6: Developing as a Professional Educator - Elements**
Beginning teachers:
1. Reflect on their own teaching practice and level of subject matter and pedagogical knowledge to plan and implement instruction that can improve student learning. (P, A)
2. Recognize their own values and implicit and explicit biases, the ways in which these values and implicit and explicit biases may positively and negatively affect teaching and learning, and work to mitigate any negative impact on the teaching and learning of students. They exhibit positive dispositions of caring, support, acceptance, and fairness toward all students and families, as well as toward their colleagues. (I, P)
3. Establish professional learning goals and make progress to improve their practice by routinely engaging in communication and inquiry with colleagues. (P)
4. Demonstrate how and when to involve other adults and to communicate effectively with peers and colleagues, families, and members of the larger school community to support teacher and student learning. (I, P)

**Course Objectives**
Students who successfully complete EELB 532 will have the knowledge, skills, and dispositions identified by the Multiple Subjects Program for this course. The following objectives identify the knowledge, skills, and dispositions that should be attained by the end of this course. Numbers in parentheses directly link the objectives to the CCTC 2042 Standards and to California Standards for the Teaching Profession. The CCTC 2042 Standards can be found at:
Knowledge

During interrelated activities in EELB 532 coursework and fieldwork, Multiple Subject candidates will:

1. Relate the state-adopted academic content standards for students in Science (K-8)/NGSS to major concepts, principles, and investigations in the science disciplines. [CCTC 8A(b), 6; TPE 3.1]
2. Become aware of elementary children’s ideas in science through various assessment strategies and understand the influence of these ideas on science instructional planning. [CSTP 5; TPE 1.8, 3.2, 4.1, 4.4, 5.1, 5.2, 5.3]
3. Learn to make pedagogical decisions based on multiple sources of information, including state-adopted instructional materials and curriculum frameworks, other professional literature, consultation with colleagues, and reflections on actual and potential practice. [CCTC 6; TPE 3.4, 3.6, 6., 6.4]

Skills

During interrelated activities in EELB 532 coursework and fieldwork, Multiple Subject candidates will:

4. Plan and implement instruction that is comprehensive in relation to the subject matter to be taught and in which the three-dimensional learning (core ideas, practices and crosscutting concepts) is achieved. [the Next Generation Science Standards; TPE 1.3, 3.1, 3.3, 3.4]
5. Plan and organize effective laboratory and/or field activities in which K-8 students learn to ask important questions and acquire increasingly complex investigation skills. [CCTC 8A(b); TPE 3.3, 3.4]
6. Integrate “AVID” strategies in science instruction that promote students’ inquiry, reading, writing, collaborating and organizing skills (“WICOR”). [TPE 1.5. 1.6, 2.2, 4.7]
7. Evaluate and integrate technology to engage students’ learning and make the instruction more effective [CCTC11, TPE 3.6, 3.7]
8. Interrelate ideas and information within and across science and other subject areas. [CCTC 8A(b); TPE 3.3, 4.3]
9. Reflect, analyze, and discuss their own pedagogical practices in order to make informed pedagogical choices in relation to the intellectual, ethical, social, personal, and physical development of students. [CCTC6; TPE 1.1, 1.4, 4.1]
10. Use appropriate instructional strategies, materials, and technologies to meet the needs of special populations in the general education classroom, including those students identified with special needs and those who are gifted and talented. [CCTC 9; TPE 3.6, 4.4, 4.8]

Dispositions

During interrelated activities in EELB 532 coursework and fieldwork, Multiple Subject candidates will:

11. Demonstrates a commitment to foster an inquiry model of teaching and learning in appropriate contexts and promote students’ critical thinking and problem-solving skills. [CCTC 6; TPE 1.3, 1.5, 3.3]
12. Understand and use students’ prior knowledge, experiences, abilities, and interests as they plan academic instruction. [CCTC 6, 9; TPE 1.1, 3.2, 4.1]
13. Demonstrate a commitment to develop and maintain an equitable classroom community that contributes to the physical, social, emotional, and intellectual safety of all students and fosters high expectations for academic performance. [CCTC 5,10; TPE 2.2, 2.5, 4.4, 6.3]
14. Demonstrate a commitment to the students’ family and cultural experiences and effectively use pedagogical strategies designed to make science content comprehensible to English Language Learners. [CCTC 9; TPE 1.6, 3.5, 4.4]
15. Demonstrate a commitment to collaborative, collegial planning by teachers and other adults in K-12 schools and take advantage of opportunities provided by local, state, and national science and science education organizations. [CCTC 5; TPE 6.4]

Course Policies
**Professionalism:** Due to the interactive nature of this course, regular attendance and high-quality participation are expected. An effective learning environment is created by everybody. I would like you to: a) being prepared for class discussion by completing all required readings/assignments, b) actively participating in and reflecting on all class activities and group discussions, c) respecting your classmates, yourself, and the instructor by helping to build a positive science learning community and d) willing to accept and adjust positively from feedback on behavior and work performances.

**Communication:** You are expected to check your CSUSB email regularly.

**Absences**
- Absence from class is **strongly discouraged**. If you do not attend class you will automatically receive a zero for that day’s in-class assignment and daily participation points.
- Should something come up and you are unable to attend you must inform your instructor via email as soon as possible. In the rare case that you are confronted with a legitimate health issue or emergency with a family member, you will be required to show proof in order to have the zeros expunged from your grade report. If you have an illness that precludes you from attending class, you must have a doctor’s note stating that you were unable to attend class on for that day – A note from the Health Center stating that you were treated is not sufficient – the (class) date must be specified and the doctor must write that you were unable to attend class. If there is a death of an immediate family member, you must submit a copy of the obituary or funeral notice.
- An excused absence may result in still receiving the points for attendance that day, but you will still lose the points for not being there to participate in the class activities. No points for attendance are given without documentation for an absence.
- Missed in-class activities cannot be made up.
- **REMINDER:** You are responsible for the materials covered in class, regardless of whether or not your absence is excused. You need to find out what you missed and have your work completed for the next class. See a classmate and/or your instructor as soon as possible after an absence.

**Late assignments**
- Assignments will not be accepted past the due date unless an agreement (e.g., an extension) is worked out with the instructor prior to the original due date. (**NOTE:** Extensions are not automatic. **Reasonable justification is needed for an extension to be granted.**)
- **ONLY EXCEPTION to this rule** is when an assignment was due but you have an emergency/excused absence as mentioned in the “attendance” section above. These cases will be addressed on an individual basis and depending on the reason for your absence may result in no to some deduction from the assignment’s total score.

**Incomplete:** In order to receive an incomplete for a course, you must have attended 80% of the class sessions and completed the course assignments. Incompletes are only given if there is a compelling reason and you have discussed this with your instructor prior to making a request for an incomplete.

**CSUSB Policy on Academic Honesty**
"Plagiarism and cheating are violations of the Student Discipline Code (see Appendix of the CSUSB Catalogue of Programs) and may be dealt with by both the instructor and the Coordinator of Student Conduct. Plagiarism is the presentation, as one’s own, the ideas and writing of another. Plagiarism is academically dishonest and subjects the offending student to penalties up to and including expulsion. Students must make appropriate acknowledgments of the original source where material written or compiled by another is used."

**Instructional Accommodations**
In keeping with the university’s Commitment to Diversity, the faculty of the College of Education fully supports the Americans with Disabilities Act (ADA). Faculty will provide reasonable accommodation to any student with a disability who is registered with the Office of Services to Students with Disabilities and who
needs and requests accommodation. If you are in need of an accommodation for a disability in order to participate in this class, please let me know ASAP and also contact Services to Students with Disabilities at UH-183, (909) 537-5238.

Course Requirements and Evaluation

1. Class Attendance and Participation (5%). Students must be active participants in class activities, including being to class ON TIME and being actively involved. We are all adults and as such have to take responsibility for our priorities and personal lives. Some specific requirements: Do not work on outside lesson planning, grading papers or other activities not pertaining to the task at hand. You may use devices for class work but refrain from using them for non-class activities. Tardiness, though at times unavoidable, is also distracting to other students in the class. Thank you in advance for your thoughtfulness and your efforts to create and maintain a good learning environment during class meetings. Full attendance and participation are worth 5 points for each class. If you are running late more than 10 minutes, you will lose half points (2.5pts). If you must miss part or all of a class, you will be responsible for contacting classmates to find out what was missed and providing the instructor with evidence of this contact a message. **You may not get above a C for this course if you miss more than TWO scheduled class meetings.**

2. Reading responses (blog) (10%) Each week you will have a “free-write” written response based the assigned reading. Soon after the first class, you should post all of your reading responses (including the first one) in your blog. Blog entries should be up-to-date according to the schedule to receive full point credit (each response is worth 10 points). Late entries may not receive credit.

3. Students’ stories about science. (5%) You will collect students’ stories about science learning from a small selected group of students. You can work with them in a group or individually but with consideration of the difference with group interactions. (You may work with the whole class if allowed to do so.) This assignment is for you to get to know your students with regard to science learning. What are their ideas about scientists and science? What resources do they have at home that can support their science learning? What experiences do they have that at home that can support their science learning? What experiences do they have that you can build science instruction on? What challenges do they have that you need to pay special attention to? This information will serve as a foundation for your science teaching that should build on students’ prior knowledge and experience. The detailed instruction will be provided and explained in the first class and this assignment is due on 4/15. [TPE 1.1, 1.3, 2.2, 2.5, 4.1] [Intern A, E]

4. PBL Project (30%) Driving Question for this assignment: Why and how should elementary teachers engage students in Project Based Learning (PBL) in their future classroom? This project is the major course assignment. You will decide whether to work individually or with another classmate (preferred) in completing the assignment. You will focus on a specific grade level, develop a rationale for the effective use of Project Based Science at this grade level, and create a PBL project that can be integrated into your future classroom.

   (1) Rationale (40 pts). Your rationale should justify the use of PBL in your future elementary classroom based on a) learning goals, b) student engagement, c) management style, d) classroom arrangement, e) assessment, f) community resources, g) material materials and artifacts, h) communicating with parents and colleagues. Due on 4/22.

   (2) Project (60 pts). Your project description should include brief descriptions of examples of at least two (2) effective PBL projects for your selected grade level. Projects can be year-long or semester-long to support depth of involvement. Besides the above, students working in pairs, should provide a full description of a PBL project for your selected grade level including necessary logistics for integrating the project your curriculum. You will provide a summary presentation of your project at the last class. Due by week 10 (6/10).
5. **Book share (5%).** Each person will read aloud to our class a portion of a children’s (trade) book that covers a science topic and explain how you can use this book in your science teaching (5 pts). Readings will be done during each class. You will also submit a summary to the designated Discussion forum on BlackBoard (5pts). You will sign-up for a date and the summary is due by **week 10 (6/10).** You are encouraged to post your summary by the week of your book share—so you won’t forget at the end. Everyone will have access to this information and you can compile your own resource list of your favorite books to begin building a science library in their classroom. [TPE 1.1, 1.6, 1.7, 3.3, 4.1, 4.3] [Intern I, J]

6. **Interview assignment (10%).** This interview is for you to get a better understanding of students’ prior knowledge and skills for the specific lesson you are going to teach. You will develop an interview protocol and fill out an interview summary-reflection form. The protocol will be explained in class and it is due on BB by **week 6 (5/6).** The summary is due on BB by **week 8 (5/20).** **You will have a chance to submit a revised assignment for the interview protocol if you are not satisfied with your grade.** [TPE 1.8, 3.2, 3.3, 4.1, 5.1, 5.2] [Intern F]

7. **“5-E” lesson plan and teaching (20%).**
   1. **Lesson Plan (60 pts).** The lesson plan includes PART I and PART II. PART I will be explained in class and is due on BB by **week 5 (4/29).** PART II will be explained in class and will be due BB by **week 9 (6/3).** You will have a chance to submit a revised assignment for PART I and PART II if you are not satisfied with your grades. (Work in pairs) [TPE 1.1, 1.5, 1.6, 2.2, 3.1, 3.2, 3.3, 3.4, 3.5, 4.4, 4.6] [Intern G, J]
   2. **Peer-teaching (20pts), each of you will lead an “Explore” activity for your peers in **week 7 (5/13).** On week 6 class time will be provided for you to work on this. You will be responsible for the appropriate amount of supplies and handouts. No make-ups are possible. (Work in pairs) [TPE 1.5, 1.8, 3.3, 4.6]
   3. **Reflection on teaching (20 pts).** You will reflect on provided questions on a designated forum on Discussion Board on Blackboard and respond to two peer’s responses. This is due by **week 10 (6/7).** (Individual) [TPE 4.6, 6.1, 6.3, 6.4]

8. **Culminating Activity – ePortfolio (15%):** Your e-Portfolio is an edited collection of evidence and reflections representing your progress toward achieving the course learning objectives. It provides you the opportunity to self-assess your understanding of meeting those objectives, as well as a summative evaluation of your progress this semester. Your ePortfolio will consist of assignments you completed for this course with a brief summary of your learning experience in doing each assignment (70 pts). You also may use your ePortfolio to display any resources from the course materials or that you have found, such as site links. You will also write a science teaching statement (30 pts). This is due by the **Final date** and instructions will be provided during the course so you can plan ahead and ask any questions. [TPE 6.1, 6.2, 6.3]

**NOTES:**

1. Please also refer to the course schedule for specific dates for the due date for assignments.
2. Assignments that you have chance to do revisions after grading (based on received feedback): Interview protocol. Lesson plan Part I and Part II. All revisions are due by **week 10 (6/7).**
3. For people who are not student teaching, please submit your fieldwork record by Week 10. As well, please be proactive in planning a lesson to teach with your host teacher.

* **The due dates may be negotiated depending on the majority of students’ needs.**
* **You may not get above a C for this course if you miss more than two full classes.** If you are on financial aid, please be aware that receiving grades of below B, I, NC, and WU may have an impact on your financial aid. It is a student’s responsibility to maintain financial aid eligibility.
A minimum of B- is essential for the successful completion of this course. **There are NO EXTRA CREDIT opportunities for this course.** Plan your schedule carefully. Careful, timely, focused planning and performance in and out of class demonstrates a disposition to be responsible and professional. Seeking feedback is welcomed BEFORE the due date.

**Grading Scale**
All course assignments will be graded using criterion-referenced methods. That is, they will be scored against a specific set of standards as will be outlined in each assignment’s scoring guide or rubric. The scoring criteria will be attached to the assignment description and will be reviewed in class. Each assignment will be calculated using a point system then converted to a percentage that corresponds to the percent weight of the assignment (see assignment descriptions above for the percentage weight of each assignment). Your percent scores for all assignments will then be totaled to give your overall course percentage and the following scale will be used to determine your final letter grade. Take notice that I calculate your assignment and total course percentage to one decimal point so every little point on an assignment is significant in the big picture.

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<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>94.0% - 100.0%</td>
<td>A</td>
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<tr>
<td>90.0% - 93.9%</td>
<td>A-</td>
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<td>87.0% - 89.9%</td>
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<td>60.0% - 62.9%</td>
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</tbody>
</table>

**Scoring Rubric for Reflection Questions**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Emerging (6 pts)</th>
<th>Proficient (8 pts)</th>
<th>Exceptional (10 pts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command of Topic</td>
<td>Response does not address the topic</td>
<td>Response addresses the topic, but not thoroughly or personally</td>
<td>Response addresses the topic thoroughly, demonstrating personal familiarity with pertinent information</td>
</tr>
<tr>
<td>Argumentative Development</td>
<td>Response relies on unrelated generalizations, vague arguments, uncertain information</td>
<td>Response shows development of related ideas with appropriate arguments and information</td>
<td>Response shows careful development of ideas with clear arguments and compelling information</td>
</tr>
<tr>
<td>Organization &amp; Control of Mechanics</td>
<td>Response does not show evidence of editing and numerous mechanical errors</td>
<td>Response shows evidence of editing and may have a few mechanical errors</td>
<td>Response shows clear evidence of editing and free of mechanical errors</td>
</tr>
</tbody>
</table>

*(The syllabus may be revised at instructor’s discretion with students’ majority approval)*
<table>
<thead>
<tr>
<th>Week/Date</th>
<th>Topic/Class Activities</th>
<th>Readings Due</th>
<th>Assignment Due</th>
</tr>
</thead>
</table>
| 1 (4/1)  | *Explore Project-Based Learning*  
No class meeting | 1. *The Difference Between Projects and Project-Based Learning*  
2. *An Example of PBL in Early Elementary: How I Started*  
3. *Project-Based Learning Activities for Elementary School Kids*  
4. *PBL projects K-5 (example projects from one PBL school)* |              |
| 2 (4/8)  | *Nature of Science; Explore Standards*  
1. Nature of science discussion  
2. Explore *Next Generation Science Standards*  
3. Discuss “Students’ stories about science assignment  
   *TPE 3.1, 3.2, 3.6 4.6*  
Assignment: “Students’ stories about science” Due by 4/15 | Chapter 1: *The Science Education Imperative*  
NGSS –Executive Summary (page 1-3) & Introduction  
(Page 2 of 11) (see BB Week 2) | Site for blog & ePortfolio (link to instructor)  
Week 1 & 2 Reading Responses (blog) |
| 3 (4/15) | *Inquiry skills; Asking Questions in Science Classroom*  
1. Inquiry Process Skills  
2. Asking questions activity  
3. Explain “Interview protocol” assignment  
4. Introduce Lesson Plan Part I (learning objectives, examples)  
   *TPE 1.5, 1.8, 3.1, 4.7, 5.1*  
Assignment: PBL Rationale. Due by 4/22 | Chapter 2: *Science Education Today* (selectively read the “in the school” examples)  
PERUSE Chapters 3: The inquiry process  
Read any articles in BB Week folder | “Students’ stories about science”  
Week 3 Reading Response (blog) |
| 4 (4/22) | *Inquiry-based science teaching/“5E” Model*  
1. “Levels of inquiry” | Chapter 5: Inquiry-based science teaching | PBL Rationale |
<table>
<thead>
<tr>
<th>Week</th>
<th>Due Date</th>
<th>Assignment</th>
<th>Reading/Response</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4/29</td>
<td>“5-E” Teaching Model [TPE 1.3, 1.4, 1.5, 3.1, 3.3, 3.4, 4.4]</td>
<td>Read any articles in BB Week folder</td>
<td>Week 4 Reading Response (blog)</td>
</tr>
<tr>
<td>5</td>
<td>4/29</td>
<td><strong>Engineering Practices</strong> [TPE 1.3, 1.5, 3.1, 3.3, 4.3]</td>
<td>Chapter 4: Constructivism Read any articles in BB Weekfolder</td>
<td>Lesson Plan Part I</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Understanding children’s ideas and teaching for conceptual change [TPE 1.1, 3.2]</em></td>
<td></td>
<td>Week 5 Reading Response (blog)</td>
</tr>
<tr>
<td>6</td>
<td>5/6</td>
<td>Prepare Peer-teaching “Explore” activity</td>
<td>Read any articles in BB Week folder</td>
<td>Interview Protocol</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Explain Lesson Plan Part II.</td>
<td></td>
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<td>2. Work in pairs for your peer-teaching activity &amp; Lesson plan part II.</td>
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<td><strong>Assignment:</strong> Interview Protocol due by 5/6</td>
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<td><strong>Assignment:</strong> Reflection on teaching. Due in Discussion forum by 5/20</td>
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<tr>
<td>7</td>
<td>5/13</td>
<td><strong>Peer teaching Explore activity</strong> [TPE 1.5, 3.3, 4.6]</td>
<td></td>
<td>Peer Teaching in class</td>
</tr>
<tr>
<td>8</td>
<td>5/20</td>
<td><strong>Addressing diversity needs and differentiated instruction</strong> [TPE 1.1, 1.6, 1.7, 2.2, 2.5, 3.4, 3.5, 4.1, 4.4] [Intern K]</td>
<td>*Reading: BB-Week 8 Textbook Chapters 6 &amp; 7: Diverse Perspectives &amp; Learning Differences, Chapter 8: Assessment Read any articles in BB Week folder</td>
<td>Interview Summary Reflection on teaching (Discussion forum) Week 8 Reading Response (blog)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Assessment in Elementary Science Classroom</strong> [TPE 5.1, 5.2, 5.3]</td>
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<tr>
<td></td>
<td></td>
<td><strong>Assignment:</strong> Lesson Plan Part II due by 6/3</td>
<td></td>
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<tr>
<td>9</td>
<td>6/3</td>
<td><strong>Technology in science education and evaluating science curriculum</strong></td>
<td>Chapter 9 &amp; 11: The Elementary Science Classroom &amp; Technology</td>
<td>Lesson Plan Part II</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Each person present one piece of technology use in science teaching. [TPE 1.7, 3.6, 3.7, 4.8]</td>
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<td>2. Work on your ePortfolio in class</td>
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<tr>
<td>Date</td>
<td>Event Description</td>
<td>Details</td>
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<tr>
<td>6/10</td>
<td>10 (6/10) Integrating science with other subjects and Communication in science classroom 1. Science talk 2. Reading and writing in science. 3. Integrating science with other subjects. [TPE 3.3, 4.3, 4.4, 4.7] [Intern H, K]</td>
<td>Chapter 10: Reading, Writing &amp; Interdisciplinary Approaches Read any articles in BB Week folder Bookshare summary (Discussion forum) PBL Project (brief presentation in class) Week 10 Reading Response (blog)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/17</td>
<td>Final 6/17 ePortfolio due by midnight</td>
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</tbody>
</table>

*The class schedule is subject to changed based on how the course progresses and students’ needs, under the consent of both the instructor and students.

**Support for Students with Disabilities**
If you are in need of an accommodation for a disability in order to participate in this class, please contact Rosie Garza in Services to Students with Disabilities at the Palm Desert Campus in RG-203, 760-341-2883 extension 78117, or at the San Bernardino Campus in UH-183, 909-537-5238, ssd@csusb.edu.
3. **PBL Assignment Description Details (Two Parts)**

**Part 1: PBL Project Rationale (40 pts)**

Driving Question for this assignment: Why and how should elementary teachers engage students in Project Based Learning (PBL) in their future classroom? This project is the major course assignment. You will decide whether to work individually or with another classmate (preferred) in completing the assignment. You will focus on a specific grade level, develop a rationale for the effective use of Project Based Science at this grade level, and create a PBL project that can be integrated into your future classroom. The project should be focused on learning science in the elementary classroom. Your choice of projects should be science-focused but should also integrate other subject areas as expected for a PBL-based learning experience.

Your rationale should justify the use of PBL in your future elementary classroom based on the following:

a) **learning goals**  
Justify the use of PBL for learning science, as well as for integrating the elementary subjects

b) **student engagement**  
Justify using PBL for engaging students learning, not only about science but learning in general

c) **management style**  
Indicate how your PBL project supports effective instruction based on your approach to teaching effectively and your (future) students’ engagement in learning

d) **classroom arrangement**  
Describe how you will accommodate students while engaging in PBL-based learning experiences in your future classroom

e) **assessment**  
Describe your plan to assess student learning effectively through the use of authentic assessment experiences

f) **community resources**  
Describe resources that your students will need to engage in PBL. At this point you can estimate what you hope to use for projects, such as resources on school property (areas and objects), as well as locations and facilities in the community beyond the school property, such as plant facilities, nature centers, museums, other natural areas, and so on.

g) **material materials and artifacts**  
Identify any perceived materials or objects that you hope to include in your classroom, on school property, or in/from the community. Include any materials that might be provided by the community, which includes parents and people they know

h) **communicating with parents and colleagues**  
Describe your plan for communicating with people who will play a role in the students’ projects and also the parents/guardians of your students, whether they play a role or not. Include others, such as administrators and other teacher and school personnel. Include potential community members or government and industry representatives who may play a role or be interested in the projects
Part II: PBL Project (60 pts)

Your project description should include brief descriptions of examples of at least two (2) effective PBL projects for your selected grade level. Projects can be year-long or semester-long to support depth of involvement. Describe the projects and update the terms below based on the specific project descriptions.

Select one of your chosen projects for development of the following items from your PBL Rationale. Revise and update the items (see list in Part I), focusing specifically on the chosen project and providing detailed descriptions.

You will provide a summary presentation of your project at the last class. You will have about 10 minutes to describe your chosen projects and explain why you chose them for your selected grade level.
4. Supporting Documents for the Assignment

a. Introduction to Project-Based Learning (PBL)

In recent times, teaching has been moving more toward student-centered learning, as you probably have learned in your other education courses. The effort has been to focus less on direct instruction and more on how to engage students actively in the learning process. One technique that has been gaining ground for some time is Project-Based Learning (PBL). Many teachers have reoriented their classrooms to focus on this approach, especially for its effective integration of the subjects, relevance to students lives and, thus, student motivation and learning.

Please read the following short articles on this topic before our first class meeting. Bring a "reading reflection" to class (hardcopy or on a device) for discussion. This should be a short summary of the articles based on your reaction to the ideas and suggestions you're reading about. I've made pdf files of the articles for ease in reading and attached those here. The articles also are linked to their online sources and it is suggested you read them in the following order:

1. *The Difference Between Projects and Project-Based Learning*³
2. *An Example of PBL in Early Elementary: How I Started*⁴
3. *Project-Based Learning Activities for Elementary School Kids*¹
4. *PBL projects K-5 (example projects from one PBL school)*²

¹²³⁴ These articles have been included below and can be accessed at the above links.
b. PBL Resources

Besides the articles assigned for the first week’s reading, please use the following resources for developing your PBL assignment:

Sites with many project examples, as mentioned in class:
- Buck Institute for Education
- Edutopia Project-Based Learning

Other sites to consider for planning PBL:
- Citizen Science
- List of citizen science projects
- National Geographic Citizen Science Projects
- Journey North
- WISE
- CIESE
- ePals

Additional Articles:
- PBL Impact on Students
- PBL Research & Evidence
- Must-know Buck Institute Project-Based Learning Resources
c. Examples from Project-Based Learning at Olander

Project-Based Learning (PBL) projects are the heart of the educational experience at Olander. Every grade, K-5, builds their academic year around three or more engaging, multi-disciplinary projects. The PBL projects are generated to rigorously address Colorado Academic Standards, while incorporating student interests and questions. The success tools of Habits of Mind are woven into all projects.

The projects at Olander School for Project-Based Learning are developmentally appropriate, engaging, creative, and ever evolving. Read below for an overview of Olander’s current projects.

<table>
<thead>
<tr>
<th>Project 1</th>
<th>Project 2</th>
<th>Project 3</th>
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</thead>
<tbody>
<tr>
<td><strong>K</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>Driving Question</strong>: What do kids need to be healthy?</td>
<td><strong>Driving Question</strong>: What does native wildlife need to thrive?</td>
<td><strong>Driving Question</strong>: How can we learn about past and present from our Grandparents?</td>
</tr>
<tr>
<td><strong>Summary</strong>: Students learn about the human body and what people need to be healthy. They explore the five senses, then learn about making healthy choices and work together to plan a Healthy Party to share our knowledge. Students also challenge older grade levels to make healthy snack choices by organizing a “Veggie Man” snack challenge.</td>
<td><strong>Summary</strong>: Students research native wildlife to become experts on what they do to survive in winter. After a visit to the local prairie dog colony, kindergartners learn important vocabulary like <em>adapt, migrate, and hibernate</em>. We create a class book and present in front of the group to share our knowledge. As part of this PBL, we visit the FC Museum of Discovery to see live and stuffed examples of the animals students study!</td>
<td><strong>Summary</strong>: Students begin learning about history by comparing inventions, games, and life from the past to those today. As a class, students develop a list of questions they can ask a grandparent or older adult to learn about the past. Students make a “Then and Now” book, as well as a timeline of their own lives. As a culminating event, students plan and host a special Grandparent Tea where they share what they’ve learned.</td>
</tr>
<tr>
<td><strong>1st Grade</strong></td>
<td><strong>Driving Question</strong>: How can we teach others about how the Pilgrims and Wampanoag lived in the 1620s?</td>
<td><strong>Driving Question</strong>: Why is it important to learn about U.S. symbols and important leaders?</td>
</tr>
<tr>
<td><strong>Summary</strong>: Students create teaching trunks filled with handmade</td>
<td><strong>Summary</strong>: Two-person teams choose a US symbol or important leader, then</td>
<td><strong>Summary</strong>: First graders learn about garden grown food through community connections, Food School, and hands-on planting in the</td>
</tr>
<tr>
<td>Driving Question</td>
<td>Driving Question</td>
<td>Driving Question</td>
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<tr>
<td>How can we help Olander kids learn about helpful insects?</td>
<td>How can we create a business that will raise money to help the community?</td>
<td>What do our families need to know about severe weather to stay safe?</td>
</tr>
<tr>
<td><strong>Summary:</strong> 2nd graders study, research and use note-taking skills to learn about beneficial insects. Students then create learning stations, activity books and hands on experiences to teach others about helpful insects. Reading, research and science standards are addressed in this project.</td>
<td><strong>Summary:</strong> 2nd graders work in groups to develop a craft kit to sell to Olander kids. They write business plans, present ideas to investors, secure start-up money, film commercials, write how-to directions, assemble their products, and sell them for profit at the Olander PBL Bazaar. Math and writing standards are addressed throughout the project.</td>
<td><strong>Summary:</strong> 2nd graders work in groups to study and research safety precautions around severe weather that affects our community. This information is used to create presentations and severe weather safety kits that are shared with our families during a weather expo. Research and science standards are addressed in this project.</td>
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<table>
<thead>
<tr>
<th>Driving Question</th>
<th>Driving Question</th>
<th>Driving Question</th>
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</thead>
<tbody>
<tr>
<td>How can we create a museum to educate our community about varying life cycles in an engaging way?</td>
<td>How can we, as authors, create a travel book to persuade readers to visit a destination within the United States?</td>
<td>How can we invent or improve a product that would appeal to today’s society?</td>
</tr>
<tr>
<td><strong>Summary:</strong> Students choose a plant or animal life cycle to</td>
<td><strong>Summary:</strong> Becoming authors, illustrators, and editors in an author</td>
<td><strong>Summary:</strong> Teams are formed based on multiple intelligences, and each child takes on the role of inventor, sales, accountant, or project</td>
</tr>
</tbody>
</table>

artifacts to teach about Pilgrim and Wampanoag life. Additionally, they work in collaborative teams to build table-top Pilgrim and Wampanoag villages to teach their families about life in the 1620s. research and write expository paragraphs on their topics. Teams then self-select creative projects to go along with their writing. Sculptures, plays, and computer slideshows are some of the ways students use their creativity to demonstrate learning. Olander Garden. A nutritionist, chef and local farmer visit to teach about the health benefits of eating local produce. Finally students taste garden veggies and create their own recipes using produce planted in the spring and harvested from the garden in the fall. Recipes are compiled into a class recipe book to share with families.
<table>
<thead>
<tr>
<th>Grade</th>
<th>Driving Question</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th</td>
<td>How can we design, test and refine a device that converts energy from one form to another and demonstrate our understanding of this device to an audience?</td>
<td>Students will explore the transfer of energy in a device while learning about energy and its forms. They will teach an audience about energy, its forms, and transformation.</td>
</tr>
<tr>
<td></td>
<td>How have the impacts of an influential Coloradan affected society?</td>
<td>The Living History Experience project is designed to help students learn about significant people, events, and era’s in Colorado’s history. Students research, then write biographies of famous Coloradans and create presentation materials to portray their subjects. A timeline of events showing cause and effect relationships and the interactions between people and cultures of Colorado helps students develop a deeper understanding of how Colorado has changed over time.</td>
</tr>
<tr>
<td></td>
<td>How can we educate our community about the importance of pollinators?</td>
<td>Through research, hands-on activities, and presenters, students learn about the many aspects of pollinators (habitats, environmental challenges, etc.). Students gain an understanding of plants needed for creating a habitat for various pollinators. Appropriate plants are put in the school garden. Persuasive essays and websites are written to advertise importance of supporting pollinators. Fourth grade holds a plant sale in the spring using seed packets and plants they have raised.</td>
</tr>
<tr>
<td>Grade</td>
<td>Driving Question: How can I go for my dreams at Eco Week and inspire others to do the same? #Go4It!</td>
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<td></td>
<td><strong>Summary:</strong> This project incorporates our Eco-Experience with narrative writing. Students write and produce a movie that captures a significant moment or experience that they had while at Eco Week. The project culminates in an Eco Film Festival.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Driving Question: How can I think like a scientist/engineer to explore a question or solve a problem and communicate my results to the public audience?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary:</strong> Students will first learn about the scientific and engineering process. Next, students will engage with either the scientific or engineering process with a fifth grade science topic and document their experience, research, products, and reflections on a website. Students will present their project to a public audience at Olander.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Driving Question: How can I create an interactive exhibit to persuade my audience to #TakeAction on?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary:</strong> The iPBL (Independent Project-Based Learning) allows student to select individual topics that are meaningful to each of them. Then students will construct a driving question, research their topic, and publish an argumentative essay. Finally, students will share their discoveries regarding their driving questions through an interactive exhibit and place a call to action for community service.</td>
</tr>
</tbody>
</table>
d. PBL Sites for Examples and Teacher Preparation

PBL sites
https://www.internet4classrooms.com/links_grades_kindergarten_12/elementary_project.html
https://www.edutopia.org/discussion/example-pbl-early-elementary-how-i-started
https://classroom.synonym.com/projectbased-activities-elementary-school-kids-8504384.html
https://ola.psdschools.org/project-based-learning-pbl

Example projects: https://docs.google.com/document/d/1b6ZP1XhjkFhuh-h2gAu9yuKTokOHu4qC18G907ygloo/edit
http://www.thewillowschool.org/philosophy/project-based-learning/

Teacher Prep
https://www.edutopia.org/article/pbl-unit-lessons-teachers
https://teachthought.com/publication/preparing-teachers-project-based-world/

Video
https://youtu.be/08D0dBGlzYQ
Passively listening to the teacher lecture isn't the most engaging way for elementary school students to learn. Although some direct instruction is necessary, the National Association for the Education of Young Children notes that a primary school curriculum should include connections between different concepts in a fun-filled way. Project-based learning strategies can help link up different content areas in a creative way that draws young students in and puts them at the center of the educational process.

**School Garden**
An elementary school garden project provides the students with a sense of community while they learn science concepts. The school garden promotes learning in math, nutrition, biology, ecology, the arts and motor development. For example, the students in all elementary school grades can plant seeds and discuss the growing cycle. As they water the seeds and watch them sprout, they will learn what plants require to thrive, as well as bridging math concepts by measuring daily or weekly growth. You can add art activities by asking younger students in kindergarten and the early elementary years to identify what colors and shapes the plants are or by having them document the project with drawings. When the vegetables are ready, the students can pick them to make a nutritious class salad. Add a literacy lesson by asking older elementary school students to write a description or poem about the beauty of their garden.

**Class Newspaper**
Newspapers inform, educate and keep readers posted on what's going on locally and around the globe. Create a newspaper project with language, literacy, art and social studies content for older students who are developmentally ready to tackle research-based tasks. By third grade, many students are able to conduct brief research projects with minimal adult help. Ask each student to choose two article topics -- one local theme about the school and another from real-life current events -- and provide research guidance for their topics. Research may include using the computer, going to the library or interviewing other people, such as classmates or the principal. Make it easy to print the paper by having the students type their articles into word processing documents. Add artwork to accompany the stories. Try
a photography activity in which the students take their own pictures that you
download or have them draw illustrations that you can scan.

**Problem Solvers**

While it's not likely that your grade school students will solve world hunger or find
a cure for the common cold, they can work together to solve a more age-appropriate
problem. Identify an issue or area of concern and brainstorm ideas, asking the
students what they think common problems are. You can also focus this on a specific
area, such as ecology and the environment. For example, students third grade and
up can work together to solve the problem of the overflowing trash cans at the
school. Students can investigate -- online, in books and by talking to experts -- ways
to recycle different types of trash. Younger students can solve a less complex
problem, such as what to do with the excess paper scraps for art class. Include an in-
class visit from a local nature or science expert, and encourage the students to ask
questions. Have each student write his own research paper on ways to recycle and
reuse, then create accompanying posters.

**Build It**

You can use an architecture project to bridge content in math, science, art, literacy
and social studies. Discuss world architecture, showing your students pictures of
buildings from different countries, cultures and times. Vote on a type of building
that the class will build. The students can work as a team to list what they need to
include to make the building functional and aesthetically pleasing. Make blueprints,
using the math skills of older grade school students to draw it to scale. Younger
students in kindergarten through grade two can identify basic geometric shapes in a
building. For example, a rectangle makes a door. Create a miniature model using
cardboard, paper, glue and other craft items and have the students decorate the
outside of the building with paints or markers to complete the model.
Projects in the classroom are as old as the classroom itself.

“Projects” can represent a range of tasks that can be done at home or in the classroom, by parents or groups of students, quickly or over time. While project-based learning (PBL) also features projects, in PBL the focus is more on the process of learning and learner-peer-content interaction that the end-product itself.

The learning process is also personalized in a **progressive PBL environment** by students asking important questions, and making changes to products and ideas based on individual and collective response to those questions. In PBL, the projects only serve as an infrastructure to allow users to play, experiment, use simulations, address authentic issues, and work with relevant peers and community members in pursuit of knowledge.

By design, PBL is learner-centered. Students don’t simply choose between two highly academic projects to complete by a given date, but instead use the teacher’s experience to design and iterate products and projects—products and projects that often address issues or challenges that are important to them.
The chart below by Amy Mayer is helpful to clarify that important difference between projects and project-based learning. Ultimately, the biggest difference is the process itself.

<table>
<thead>
<tr>
<th>Projects . . .</th>
<th>Project Based Learning . . .</th>
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</thead>
<tbody>
<tr>
<td>Can be done at home without teacher guidance or team collaboration.</td>
<td>Requires teacher guidance and team collaboration.</td>
</tr>
<tr>
<td>Can be outlined in detail on one piece of paper by the teacher.</td>
<td>Includes many “Need to Knows” on the part of the students and teachers.</td>
</tr>
<tr>
<td>Are used year after year and usually focus on product (make a mobile, a poster, a diorama, etc.).</td>
<td>Is timely, complex, covers many TEKS, and takes a team of highly trained professionals significant time to plan and implement.</td>
</tr>
<tr>
<td>The teacher work occurs mainly after the project is complete.</td>
<td>The teacher work occurs mainly before the project starts.</td>
</tr>
<tr>
<td>The students do not have many opportunities to make choices at any point in the project.</td>
<td>The students make most of the choices during the project within the pre-approved guidelines. The teacher is often surprised and even delighted with the students’ choices.</td>
</tr>
<tr>
<td>Are based upon directions and are done “like last year”</td>
<td>Is based upon Driving Questions that encompass every aspect of the learning that will occur and establishes the need to know.</td>
</tr>
<tr>
<td>Are often graded based on teacher perceptions that may or may not be explicitly shared with students, like neatness</td>
<td>Is graded based on a clearly defined rubric made or modified specifically for the project.</td>
</tr>
<tr>
<td>Are closed: every project has the same goal. (As in the example below, the end result is always The Alamo.)</td>
<td>Is open: students make choices that determine the outcome and path of the research.</td>
</tr>
<tr>
<td>Cannot be used in the real world to solve real problems.</td>
<td>Could provide solutions in the real world to real problems even though they may not be implemented.</td>
</tr>
<tr>
<td>Are not particularly relevant to students’ lives.</td>
<td>Is relevant to students’ lives or future lives.</td>
</tr>
<tr>
<td>Do not resemble work done in the real world.</td>
<td>Is just like or closely resembles work done in the real world.</td>
</tr>
<tr>
<td>Do not include scenarios and background information or are based on events that have already resolved.</td>
<td>The scenario or simulation is real or if it is fictitious, is realistic, entertaining, and timely.</td>
</tr>
<tr>
<td>Are sometimes based around a tool for the sake of the tool rather than an authentic question. (Make a Prezi.)</td>
<td>Use technology, tools, and practices of the real world work environment purposefully. Students choose tools according to purposes.</td>
</tr>
<tr>
<td>Are turned in.</td>
<td>Is presented to a public audience encompassing people from outside the classroom.</td>
</tr>
<tr>
<td>Are all the same.</td>
<td>Is different.</td>
</tr>
<tr>
<td>Make a model (or diorama or mobile... ) of the Alamo.</td>
<td>Design a fortification that would take your community through a bio (or other non-traditional attack) and make a recommendation to the city council for future planning.</td>
</tr>
</tbody>
</table>

What’s the Difference Between “Doing Projects” and Project Based Learning? Image attribution flickr The Difference Between Projects And Project-Based Learning; © Amy Mayer, @friEdTechnology, The Original WOW! Academy, www.friEdTechnology.com Please copy and use freely!
An Example of PBL in Early Elementary: How I Started

By mreddieck

I am a first grade teacher who has taught for twenty years. When I look at my students and see how much the first grade classroom has changed over time, it is hard for me to imagine what jobs will be out there for them in 15 years. However, what is clear is that there are specific skills -- both academic and interpersonal -- that my students will need to possess to find a successful career.

The Common Core standards clearly outline what my students need to be able to master when they leave first grade, however there are also other crucial skills that many educators are calling the 4 C's: Collaboration, Communication, Critical Thinking and Creativity that are skills highly desired by future employers.

As a teacher I have asked myself, "How do I integrate the Common Core Standards and start teaching these other highly desirable skills in first grade?" My answer to this question has been found in Project Based Learning (PBL).

My biggest challenge has been where to start. I purchased PBL in the Elementary Grades, and I decided to start small. I started the year with the usual review of the alphabet. But this year, all of the letters coincided with local animals. Letter F was the Yellow Legged Frog. Students found out that this local frog has become a "species of concern". Students wanted to help save this little creature and so our first project for the year was: How can we help save the Yellow Legged Frog? The link below shows how beginning first graders were able to help save our local Yellow Legged Frog.

During the second half of the year, my students became involved in the Trout in the Classroom project. Our three first grade classes have been a part of this project for several years. We have gathered activities, made PowerPoint presentations, and found books that we have used for several years to teach this unit. However, I wanted to turn this unit into a PBL experience. I
felt relatively successful with my first attempt at PBL with the Yellow Legged Frog Project but decided I really needed to review the Common Core science and writing standards so that I could address as many standards as possible during this project. I also wanted to give my students a meaningful purpose to what they were learning. Thus, the most important things I considered when I started to convert our fantastic unit into a PBL experience, were:

1. **The Driving Question**
   The driving question for this year’s Trout in the Classroom project became: “How do we teach others to successfully raise trout eggs and help them understand the importance of keeping our watersheds healthy?” This driving question gave true purpose to what students were learning throughout this project.

2. **The Common Core standards that can be incorporated throughout the unit**
3. **The local agencies or experts that could lend experience or insight into my students’ understanding of the subject matter**
   For this project, we partnered with [Trout Unlimited](https://www.troutunlimited.org), [California Fish and Game Department](https://www.dfg.ca.gov), [Marin Municipal Water District](https://www.marinh2o.org), and the [Watershed Stewards Program](https://www.watershedstewards.org).

4. **The audience outside of our immediate classroom community**
   Our audience became a classroom in San Francisco where a friend of mine teaches kindergarten.

I can see how PBL is the vehicle by which I can teach both the Common Core Standards and the 21st century competencies to my first graders. I am also very excited that I don’t have to throw out all the great units I have taught in the past, but instead can view them through a PBL lens. This requires just those four things outlined above to get started. In the future, I am looking forward to using just those four basic ideas to help my kindergarten teacher friend turn her oviparous animals unit into a Project Based Learning experience!