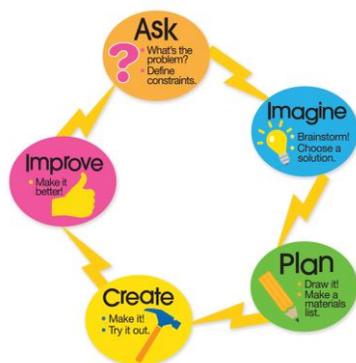


## Collaboration as Language Development: An Approach to the NGSS for ELL Gifted Students

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As I walked into a second grade classroom, the students were actively involved in an engineering challenge related to bridges. They were working in small groups to test three different types of bridges using wooden blocks, large notecards, and washers as weights. How many washers can each bridge hold? As I circled through the groups, I asked various students to describe what they were doing. Some students were able to describe the exact task, including using the language of the discipline: “We are testing an arch bridge, a beam bridge, and a double beam bridge to compare how many weights can go on each.” Other students explained the same task without describing the types of bridges, and one girl said to me simply, “We are collaborating.” I love this! This English Language Learner (ELL) is not only participating in a hands on, content and language rich experience, but she also understands one of the fundamental purposes of the Engineering Design Process (EDP): collaboration. The question is, was this an English Language Development (ELD) lesson? In what ways can we parallel the Next Generation Science Standards (NGSS) and the ELD standards? In what ways are we differentiating for the Gifted ELL in this type of lesson?



The key word here is collaboration. The ELD Standards (California Department of Education, adopted 2012) ask the students to “interact in meaningful ways” at three different levels: collaborative, interpretive, and productive. In the lesson described above, the students were “exchanging information and ideas with others through oral collaborative discussions,” “offering and supporting opinions and negotiating with others in communicative exchanges,” and “listening actively to spoken English in an academic context.” These standards cannot be practiced in isolation; the students must be given meaningful opportunities to collaborate in specific, authentic, academic contexts with the language of the discipline integrated into

the experience and with connected opportunities to reflect orally on the process.

The other important element in this collaboration is the heterogeneous grouping while working in content areas. The ELL described above was participating actively with peers at different levels of language proficiency, which allows for language-rich discussions. This interaction with intellectually stimulating content and discourse can also help us in identification of Gifted ELL students. The teacher scaffolds included diagrams on the board with the bridges labeled as well as a chart of the EDP so that students could clearly understand the purpose behind the activity: “We are testing different types of bridges so that we can decide which elements of design we will want to incorporate into our own bridges.” Also, “We are testing how different designs work to balance the gravitational force of the weights, providing an equal and opposite force.” And, ultimately, “We are proving that structures have parts that are interrelated and serve a function.”

The disciplinary core idea from the engineering standards (NGSS) present in this learning experience is, “because there is always more than one possible solution to a problem, it is useful to compare and test designs” (ETS1.C), and the crosscutting concept is related to structure and function: “the shape and stability of structures of natural and designed objects are related to their function” (ETS 1-2). What better way to differentiate for our gifted ELLs than to provide engineering challenges that connect to and prove a larger universal theme in an inquiry-based, language-rich environment? Through a series of learning experiences and the EDP, the students will be able to prove with evidence that *structures have parts that are interrelated and serve a function*. As a result of the thorough exploration that results from the EDP, this concept can then be applied across the disciplines with a concrete example to reference.

The EDP parallels the 5E Model for lesson planning, and we can layer the ELD standards into each step, thus justifying the necessity for these kinds of experiences in our ELL classrooms. The steps demonstrate the progress from the collaborative standards to the interpretive standards to the productive standards.

<b>5E Model Lesson</b>	<b>Engineering Design Process</b>	<b>ELD Part 1: <i>Interacting in meaningful ways</i></b>
Engage	Ask: What makes a bridge work?	2.A.1 – asking questions, adding relevant information
Explore	Imagine/Plan: Looking at different piers and bridge types, testing how much weight they hold. Testing different materials for properties conducive to holding weight.	2.A.3 – offering opinions, negotiating conversations
Explain	Plan/Create: Develop a design that includes labels for a bridge with certain criteria, build the bridge.	2.A.1 Exchanging information and ideas
Elaborate	Improve: Groups test each other’s designs against criteria.	2.B.5 Listening actively to answer questions
Evaluate	Improve/Ask: Redesign if it didn’t work to fulfill all criteria. Redesign to hold more weight if it did work.	2.C.11 Support opinions with evidence  The ____ part of the bridge did not work

	<p>What do I need to change to make it more effective?</p>	<p>because_____.</p> <p>We can fix it by _____.</p>
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In school districts around California, teachers are being asked to demonstrate that they are providing both *integrated* and *designated* ELD lessons for students. The above lesson is integrated; all students, regardless of language designation, are participating in the lesson, and it is differentiated to meet the needs of EL students. One can imagine the variety of English Language Arts lessons that might be done to further deepen this experience, whether they be conducted before, during, or after the lesson. The challenge is to make our *designated* ELD lessons connect as well. Designated ELD lessons are those minutes that are required by Federal law to meet the needs of ELLs on a daily basis. In order to best set attainable goals for each student, these lessons are usually meant to be done in small groups and clustered by ELD level.

A day-to-day writing journal can serve as a jumping off point for designated ELD lessons (especially from Part II of the standards, “Leaning About How English Works”). These lessons might include using verbs and verbs tenses appropriately to describe what happened (2.II.B.3), modifying writing to add details (2.II.B.5), or connecting ideas by combining clauses (2.II.B.6). As a result, the context for these designated ELD grammar lessons is meaningful because the writing that they are beginning with describes a hands on experience in which they were actively engaged.

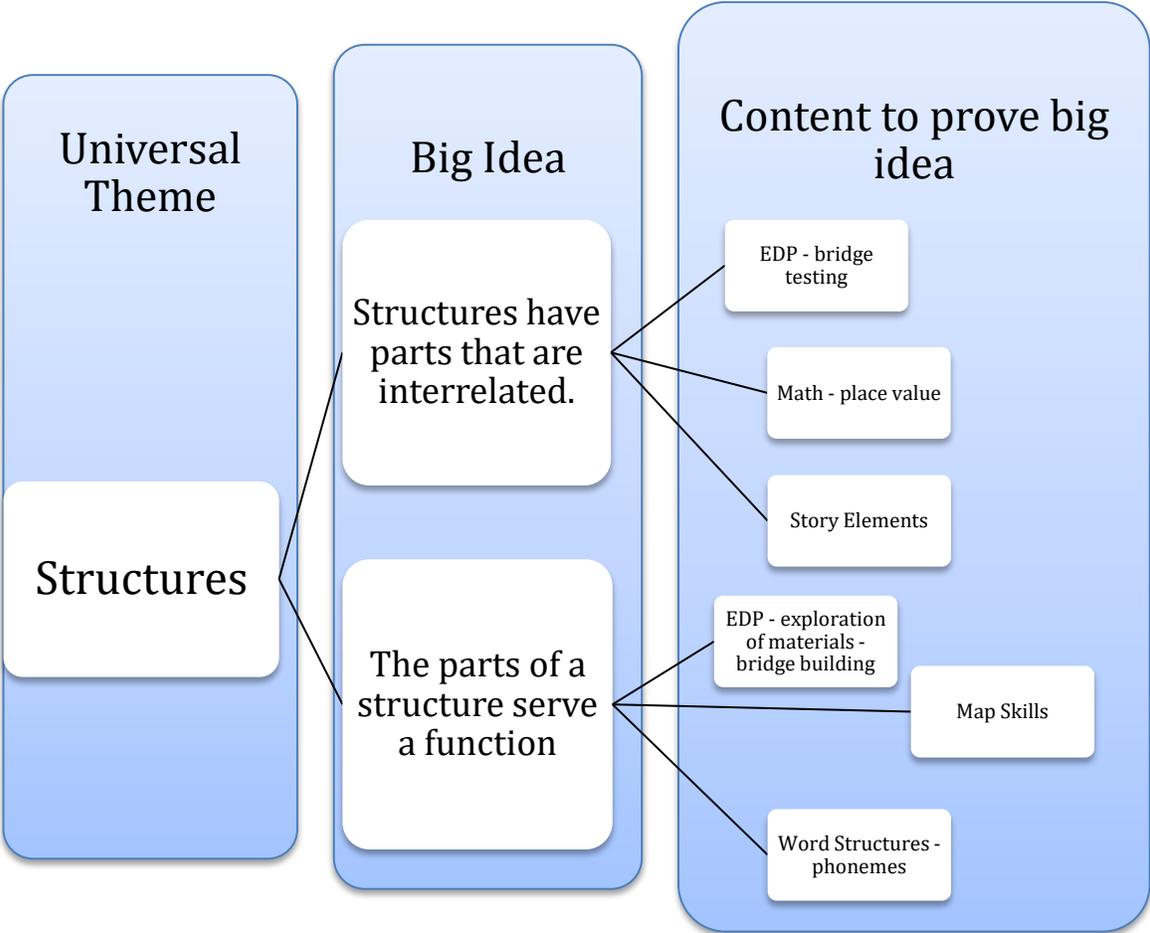
When we provide learning experiences that connect to larger themes, we not only provide acceleration for our gifted learners, we provide context for all learners. Our ELL students need this context in order to make meaning connected to the world around them, to the grade level content, and to the language that we are asking them to use in order to “interact in meaningful ways.” In parallel to the learning experience reported above, a series of lessons that further supports the big idea can be presented, including one lesson at the beginning of the unit that explicitly demonstrates the critical thinking skills necessary in the process of proving with evidence. As long as researched-based ELD strategies are being used throughout the integrated lessons, our EL students can and will access the ideas being presented.

For example, a teacher might choose to begin this particular unit using a deductive reasoning lesson (below), and then follow up with an inquiry investigation using a picture of a different type of bridge, relating it explicitly to the direct instruction lesson on place value. Once the idea has been introduced and practiced, every learning experience that we create in the classroom serves to provide deeper proof and connection. Our ELD students can conceptualize the content with more depth and complexity if they are provided the language and context for the content.

Lesson Syntax	Activity	ELD
Motivate	<p>Play “balloon bounce” silly game (Kagan 111).</p> <p>Teacher: you will build a structure with your group by joining hands. The job of the group (function) is to keep the balloon up in the air.</p>	<p>1.A.1 Exchanging information and ideas</p> <p>EL strategy: physical engagement</p>
Present the big idea	<p>Structures have parts that are interrelated and serve a function.</p> <p>Teacher presents chart, accesses prior knowledge about words, gives examples. Students partner share to relate idea to game.</p>	<p>EL strategy: charting, breaking down language, partner share.</p>
Practice with the big idea	<p>Analyze a bicycle (real or image).</p> <p>What are the parts of the structure?  How does one part relate to another?  What does each part do (function)?  Why does each part need another part to work?</p>	<p>Students work in partners to discuss questions with their own picture, using a marker to show connections.</p>
Apply the big idea to new content	<p>Read informational text related to suspension bridges. Identify the parts of the text and how they help us to see the larger structure. What function do the captions serve? The illustrations? The bold words?</p>	<p>2.II.A.1 Understanding text structure</p>
Integrate the idea across the disciplines	<p>Add information from text to class chart that demonstrates each type of bridge (NGSS).</p> <p>Students use EDP to build a mini structure with Legos. They describe how the parts are interrelated and what function they each serve to a small group.</p>	<p>2.I.C.9 Plan and deliver brief oral presentations</p>

Both the NGSS and the ELD standards ask students to make connections to larger themes, to engage in hands-on experiences, and to collaborate with peers in order to solve problems. The Engineering Design Process allows students these opportunities in a meaningful context, whether it be carried out in relation to science or another content area. By connecting the crosscutting concepts in the NGSS to

universal themes, we can concretely make interdisciplinary connections for all learners. As educators of the Gifted, we are not only responsible for providing educational experiences for those who have already been identified; we are also responsible for providing educational experiences in which students, regardless of language designation, are given opportunities to demonstrate their uniquely convergent or divergent ways of thinking, which might lead us to identification. Interdisciplinary, differentiated units of study help us to achieve this goal.



## References

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