



National Research & Development Center to Improve
EDUCATION FOR SECONDARY ENGLISH LEARNERS

WestEd 

Mathematics Lessons in Three Moments: Amplified Opportunities for English Learners

The Three Moment Architecture Lesson provides educators with guidance and tools to accelerate the language development, academic literacy, and disciplinary knowledge of all students, particularly English Learners.

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Designing Math Lessons to Empower English Learners!

What type of lessons develop deep conceptual understanding among your EL students?

The Three Moment Architecture Lesson is a strategic approach for designing engaging, high-quality mathematics lessons. The following graphic shows how the Three Moment Architecture Lesson compares to some other widely used math lesson designs throughout the United States. While the various lesson designs all share similar features, the Three Moment Architecture explicitly focuses on supporting English Learners through scaffolded strategies that amplify learning opportunities throughout the lesson cycle.

		Other Math Lesson Designs			
Three Moment Architecture Lesson		Jigsaw	Conceptual	Rich Math Tasks	Three Act Lesson
Moments in a Lesson Cycle	1. Preparing the Learner Activate students' prior—but not prerequisite—knowledge and focus on a few key ideas and language to engage with the main concept.	Prepare	Surface Prior Experience	Launch	Engage and Perplex
	2. Interacting With the Concept Focus students' attention on making connections across mathematical procedures/representations to further develop and apply models, metaphors, and explanations.	Jigsaw Project	Develop a Math Concept	Explore	Seek Info and Solutions
	3. Extending Understanding Offer students choices to connect the central concept to novel situations and represent new understandings in different genres/representations.	Extend	Apply to Story Problems	Summarize	Reveal, Discuss, Extend

Want to learn more about how the Three Moment Architecture works? Read the book chapter “Educative Mathematics Curriculum Materials for English Learners: Varying the Intensity of Scaffolding” (Chu & Hamburger) from the book *Scaffolding for Multilingual Learners in Elementary and Secondary Schools* (2022).

Clear and Ambitious Vision for Math Instruction That Will Lead to Quality Interactions for English Learners

The graphic above shows how the Three Moment Architecture can be used to create engaging math lessons for English Learners. When designing instruction for English Learners utilizing the Three Moment Architecture, it is critical to keep in mind the following:

- » Center learning on **generative disciplinary ideas and concepts** that are powerful and relevant to students' lived experiences.
- » Integrate purposeful **scaffolding throughout the lesson** that effectively engages students with these ideas and concepts. Teachers can further vary the intensity of scaffolding with the goal of offering less scaffolding as students develop greater autonomy with content and language.
- » Create learning opportunities in which **students are invited into productive dialogue** focused on these disciplinary ideas and concepts. The dialogue can grow from using everyday language with peers in a reciprocal manner to using more technical language and individual ways of demonstrating their understanding.

Comparing Sample Math Lessons From the Three Moment Architecture Approach and the Three Act Lesson Approach

Below are two sample math lessons. Both of these sample designs of lessons are intended to deepen students' conceptual understanding of a main concept or idea by allowing them to discuss, interact, and eventually extend their understanding through the use of multiple mathematical models. Although these lessons have similar approaches, the **Three Moment Architecture** provides purposefully designed scaffolds throughout the lesson that allow multiple entry points for English Learners to discuss these concepts through sustained and reciprocal interactions.

Sample Three Moment Architecture Math Lesson: Patterns of Growth and Change

Preparing the Learner:

- » Students brainstorm examples of pattern, share ideas based on what they know, and generate a working definition.
- » Students get an envelope of cards with different geometric patterns found in the real world (such as the patterns shown in Figure 1). Without showing their cards to each other, students take turns describing the patterns shown on their cards using everyday language. They discuss key characteristics of the patterns on their cards, then create groups among patterns after brainstorming ideas.

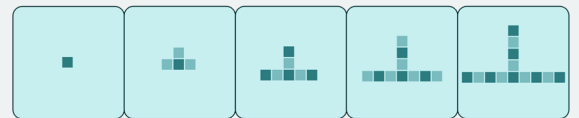
Figure 1. Examples of Geometric Patterns Found in the Real World.



Interacting With the Concept:

- » Students get another set of cards that feature patterns that are countable (such as the patterns shown in Figure 2). Students describe the cards one at a time using more sophisticated language, put the cards face down, then propose and discuss a sequence for their pattern. Cards are then revealed and discussed further, and sequences are refined, if needed.

Figure 2. Examples of Countable Patterns.



- » Formulaic expressions can be offered to help students with their discussions (see Figure 3).

Figure 3. Examples of Discussion Prompts for Students.

Strategic action (what you can do)	Specific statement (what you can say)
Point out what is the same or different.	Both of these... have... When I look at..., this... has more/less... Unlike..., this... has...
Put into groups and take groups apart.	If I put together..., I get... If I look at..., I see... If I take apart..., I have...
Find and describe what repeats.	Something that I see repeating is... If I keep doing..., I will get... A shortcut for repeating this is...

Extending Understanding:

- » Students are asked to create their own sequential patterns, solve the problem by finding the sequence and associated formula, develop two questions for other groups to answer and then share with other groups.
- » Groups exchange the patterns they've made with other groups. The groups then assess the quality of these patterns and provide feedback about them. Each original group then refines and finalizes their pattern problems.

Sample Three Act Math Lesson

Act 1: Engage and Perplex

- » Students respond to a visual (either a photo or video) intended to hook student interest in the task.
- » Students address questions designed to elicit ideas around a given concept.

Act 2: Seek Information and Solutions

- » Students begin the modeling process.
- » Students gather tools, information, and resources to answer questions.
- » The teacher poses questions to promote alternate approaches.

Act 3: Reveal, Discuss, Extend

- » The teacher confirms the answer to the modeling task in the real world.
- » Students then compare solutions and think of other questions to pursue.

As seen in the lessons above, the Three Moment Architecture embeds tasks to help English Learners utilize their home languages through an asset-based approach that helps them progress from more informal ways of discussing concepts to more technical, authoritative ways as they develop expertise. The Three Moment Architecture serves as a great model for how other lesson designs can be amplified to increase quality interactions and deliberate focus on language that invites English Learners to make choices on how they approach problems and the different ways they communicate in solving them.

References

Chu, H., & Hamburger, L. (2021). Supporting English Learners by the use of patterns. *The California Mathematics Council ComMuniCator*, 45(4), 38–41.

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