Content-Based Science Instruction for Secondary English Learners

Note: This course is now archived and no longer actively moderated by an instructor. The syllabus is provided here as a reference.

Course Description

Participants will implement the Next Generation Science Standards (NGSS) in linguistically diverse classrooms. Participants will inform teaching decisions based on knowledge of the stages of English language development and how the stages impact students' learning needs. Participants will acquire skills to

1) use knowledge of students' English language skills to inform pedagogical decisions,

2) differentiate instruction to make science content comprehensible for students with differing language levels, and

3) modify assessments so that they more comprehensively gather evidence of English learner (EL) understanding of complex science material.

Student Learning Outcomes

Course participants will be able to

- Demonstrate understanding of English language proficiency levels.
- Apply knowledge of language proficiency to guide differentiated instruction when designing and implementing lesson plans.
- Describe the NGSS shift to three-dimensional science learning and how that shift impacts ELs.
- Apply strategies to differentiated lesson plans that make science content comprehensible for ELs.
- Modify assessments in order to gain understanding of students' scientific understanding regardless of language proficiency level.

Course Assignments

Module 1

Review the Lesson Plan Template. Review the science standards you're currently working with. Based on the recommendations on writing objectives, develop two language objectives and two content objectives. Submit for grading.

Module 2

Discussion and evaluation of strategies for instruction for ELs; implement one strategy in the classroom and reflect on use of strategy.

Module 3
Provide synthesis of three dimensional learning from the NGSS and the Framework for K–12 Science Education.

Module 4
Submit an analysis of assessment for access of ELs, and suggest modifications.

Module 5

- Plan a standards-based science lesson-using the Lesson Plan Template.
  - The lesson should provide differentiated activities to meet the needs of ELs at a minimum of two language levels.
  - Be sure to state the standard you are teaching and the specific language and content objectives(s) of the lesson.
- Teach your lesson and reflect on it based on the rubric provided. Submit for grading.

Suggested Course Schedule
Please use the following schedule as a guide to completing the course.

Module 1:
Weeks 1 & 2

Module 2:
Weeks 3 & 4

Module 3:
Weeks 5 & 6

Module 4:
Weeks 7 & 8

Module 5:
Weeks 9 & 10

Student Engagement Inventory		
Educational Activity	**Hours Student Engaged**	**Explanatory Comments (if any)**
Assigned Readings	12	
Project	7	
Online Interaction	12.5	
Field Work, Experience	8.5	
Total Hours:	**40**	

Course Structure and Grading

The course consists of five modules and runs for ten weeks. Each module will require approximately a 3-hour commitment.

WEEK	TOPIC	OUTCOME	READINGS/VIDEOS	ASSIGNMENTS
1-2	• Review the course platform features • Introduction to course content • Introduce yourself • Overview of second language acquisition, language proficiency levels	Participants will be able to • Identify the language level of a focus student. • Describe the focus student and his or her language level from an additive/strengths or can-do model. • Write a language objective and a content objective that would be appropriate for a specific language level.	Lesson Plan Template and Four Strands of Sheltered Instruction • Himmel, J. (2012). Language objectives: The key to effective content area instruction for English learners. Washington, DC: Colorín Colorado. Retrieved from http://www.colorincolorado.org/article/49646 **Optional:** • Robertson, K., & Ford, K. (2008). Language acquisition: An overview. Washington, DC: Colorín	• Review the Lesson Plan Template • Review the science standards you're currently working with. Based on the recommendations on writing objectives provided, develop two language objectives and two content objectives. Submit for grading.

			Colorado. Retrieved from http://www.colorincolorado.org/article/26751 • Center for Applied Linguistics. (2014). Seven principles of effective instruction for English learners. Washington, DC: Author. Retrieved from http://www.cal.org/content/download/4351/65219/file/seven-principles-of-effective-instruction-for-english-learners-english-and-spanish-version.pdf • Orozco, S. (2013). CA ELD standards introduction video. Retrieved from http://www.youtube.com/watch?v=al2X4MjPKD0	
3-4	Strategies to scaffold science content learning for ELs	Participants will be able to • Synthesize strategies that work for scaffolding content for ELs. • Apply a new strategy in their classroom with their focal student in mind.	• Herr, N. (2007). Strategies for teaching science to English language learners. Retrieved from http://www.csun.edu/science/ref/language/teaching-ell.html • Carrier, S. J. (2011). Effective strategies for teaching science vocabulary. LearnNC.org. Retrieved from http://web.archive.org/web/20180112225127/http://www.learnnc.org/lp/pages/7079	**Recommended submit for grading by October 24:** • Try one of the strategies presented in *Strategies for teaching science* in your classroom. Describe the lesson and its implementation. Next, reflect on what worked, what didn't, and what you might do next time. Submit for grading.

			Optional: • Lee, O and Miller, E (in press) The CCSS for Literacy in The CCSS for literacy and science with English Language Learners: Grade 6-12 • New York Science Teacher. (2014). Science bilingual and ESL glossaries. Retrieved from http://newyorkscienceteacher.com/sci/pages/esl/index.php • Crumpler, B. (2013). Fostering STEM vocabulary development in ESL students. Multibriefs.com. Retrieved from http://exclusive.multibriefs.com/content/fostering-stem-vocabulary-development-in-esl-students	
5-6	An overview of the Next Generation Science Standards and how they impact instruction for ELs	Participants will be able to • Explain the vision of the Framework for K–12 Science Education and the three dimensional learning of the NGSS based on the required reading for this module. • Identify the	• National Research Council. (2012). A framework for K–12 science education: Practices, crosscutting concepts, and core ideas. Washington, DC: National Academies Press. Retrieved from http://www.nap.edu/catalog.php?record_id=13165 **pp. 24–35, 49–53** • Miller, E. C. (2014). Next	**Recommended submit for grading by November 7:** • Develop a description of three dimensional learning of the Framework and the NGSS, including how the three dimensions work together to form a more authentic view of science learning, and how this is different from a traditional science classroom. Submit for grading.

		performance expectations in the NGSS, the crosscutting concepts, disciplinary core ideas, and science practices. • Locate the questions for Disciplinary Core Ideas in the Framework and explain how these questions correlate to the performance expectations.	generation science standards: Offering equitable opportunities for ELLs to engage in science. Washington, DC: Colorín Colorado. Retrieved from http://www.colorincolorado.org/article/61340	
7-8	Issues and approaches to assessing ELs in science classes	Participants will be able to • Using information gained from the review of articles in this module, analyze an assessment currently used. • Share possible modifications with online colleagues.	• Carr, J., Lagunoff, R., & Sexton, U. (2007). Assessing English learners. In *Making science accessible to English learners: A guidebook for teachers, Updated edition* (pp. 77–86). San Francisco, CA: WestEd. Retrieved from *https://www.wested.org/online_pubs/Carr_Science_chap6update.pdf* **Read chapter 6.** • Miller, E. (2014). Sample simple modified lesson plan with template. Retrieved from https://docs.google.com/a/scfschools.com/document/d/17zRFDf1SRndN_ZZnkcOU2Uc_pMXLwh1aBk5JngDwl7I/edit **Very detailed lesson plan example with NGSS and ESL**	**Recommended** • Based on either your focal student or the content and language objectives you developed in weeks 1-2, adapt an assessment you have used in your classroom to make it more accessible for English learners. Describe your adaptations and why the assessment is now better responsive to ELs' needs. Submit for grading.

			modifications **Optional:** • West Virginia Department of Education. (n.d.). Examples of formative assessment. Retrieved from https://wvde.us/wp-content/uploads/2018/10/2018formativeassessment_toolkit.pdf • Lee, O., & Avalos, M. (2002). Promoting science instruction and assessment for English language learners. *Electronic Journal of Science Education, 7*(2). Retrieved from http://ejse.southwestern.edu/article/view/7704/5471	
9-10	Final project	Participants will be able to • Identify the modifications for learners at various English language development levels in the sample assessments.	• WIDA. (n.d.). Using the WIDA Can-Do Descriptors.	**Recommended** • Plan a standards-based science lesson-using the Lesson Plan Template. o The lesson should provide differentiated

		• Plan a science lesson that meets the needs of learners at two language proficiency levels. • Develop a differentiated assessment.	Retrieved from http://www.wida.us/standards/CAN_DOs/ • The California Department of Education. (2012). English language development standards. Retrieved from http://www.cde.ca.gov/sp/el/er/eldstandards.asp	activities to meet the needs of ELs at a minimum of two language levels. ○ Be sure to state the standard you are teaching and the specific learning target(s) of the lesson. • Teach your lesson and reflect on it based on the rubric provided. *