

Lesson Plan Template

Instructions: This lesson plan template provides a space for you to plan lessons around the Education Connections model of Sheltered Instruction (SI), which includes four strands—*define, modify, cultivate, apply*. (See page 4 of this document for more information on the four strands). Fill out the information about your lesson plan in the space provided in the left-hand column, *Lesson Information and Activities*. While you plan, list which strand(s) relates to this portion of your planning in the right-hand column, *SI Strand(s)*, along with any notes about how the strand can be implemented effectively in this lesson.

Lesson Information and Activities						SI Strand(s)														
<p>Lesson Title: The Spicy Salsa Virtual Lab</p> <p>Content Area: Science (Chemistry) Grade Level(s): 9-10</p> <p>Unit Description: This lesson is part of a unit on acids and bases. Prior to this Acidifying Salsa simulation, students have completed an introductory lab to determine the pH of a variety of household substances and to label a pH scale. This activity will connect the idea of pH to solving a real world problem, while at the same time familiarizing students with food science lab equipment and standard techniques for sampling.</p> <p>Length of lesson: Two 45-minute class periods Number of ELs:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 20%;">Proficiency Levels</td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td>ELs (numbers and/or names)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>Classroom Setting: Sheltered Chemistry Class/ High School</p> <p>Program Model: _____</p> <p>Other relevant student information: Grouping is intentional to foster student use of native language if necessary to clarify and build on ideas. The teacher can also emphasize cognates to assist with comprehension of academic vocabulary.</p>							Proficiency Levels							ELs (numbers and/or names)						
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Standards and Objectives						DEFINE														
	Language Objectives	English language proficiency standards																		
1	SWBAT actively listen to and follow directions to complete a virtual lab simulation	<p>WIDA: ELD Standard 1: English language learners communicate for Social and Instructional purposes within the school setting</p> <p>ELD CA: 1.A Collaborative: Exchanging information and ideas with others through oral collaborative discussions on a range of social and academic topics</p>																		

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2	SWBAT discuss and record possible solutions to a food science problem using precise academic vocabulary.	<p>WIDA: ELD Standard 4:English language learners communicate information, ideas and concepts necessary for academic success in the content area of Science</p> <p>ELD CA: 1.C Productive: Selecting and applying varied and precise vocabulary and other language resources to effectively convey ideas</p>	
3			
Content Objectives		Content Standards	
1	SWBAT practice and explore proper sampling techniques and lab processes as directed.	CCSS.RST.9-10.3. Follow precisely a complex, multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.	
2	SWBAT identify causes, effects, and solutions to a pH imbalance problem based on evidence obtained from a simulation lab	NGSS.HS-PS1-6 Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.	
3			

Incorporating all four language domains

Identify how each of the language demands of the tasks are related to each language domain.

	Written	Oral
Receptive	Reading Students will read information in each step of the virtual lab	Listening Students will listen for understanding and follow directions as they proceed through the simulation
Productive	Writing Students will complete a Problem-Solution Map and write a 3-2-1 exit ticket using target vocab and conventions of grammar	Speaking Students will discuss causes, effects and possible solutions with their peers

Key language for students (words and phrases, grammatical structures, sentence types, structure and amount of speech/text, organization of ideas, genre, etc.)

General academic language	Language specific to the content area
Responding to who/what/where/when/why/how questions using correct grammatical structure Summarizing information Identifying problems, causes, effects and solutions	Key words about video content would include: pH, acid, microorganism, pathogen, toxins, heat processing, canning, homogenize, repeatability, stabilize

Key characteristics of teacher talk (ways to make the content comprehensible for all students, ways to model key language, etc.)

- Have the Problem-Solution Map prepared on the board or project with IWB and type in students' responses as they are elicited so everyone can see them.
- Project the interactive simulation as a whole class teaching tool. By showing the simulation on an IWB or screen, the teacher can model how to use it and facilitate students' thinking.
- Pause after each screen to elicit definitions of key vocabulary words used throughout the simulation—pH, acidify, C.bot, toxins, canning, samples. Students can record in their vocabulary notebooks and add any new words to class word wall.
- Pair students up to explore the interactive simulation with a partner. This will encourage students to verbalize their thinking and strategies and assist each other with making decisions and completing lab steps.

How the lesson will incorporate bilingualism/students' native languages as resources

- Students will be paired with native language peers for support
- Students will have bilingual chemistry glossaries for reference. This web site has examples: http://www.p12.nysed.gov/biling/bilinged/bilingual_glossaries.htm
- Students will be asked to share examples of foods their families can/preserve in their households

Materials and Texts

DEFINE

APPLY

Supplementary Materials and Realia: Bring in a jar of salsa and/or the ingredients to make salsa

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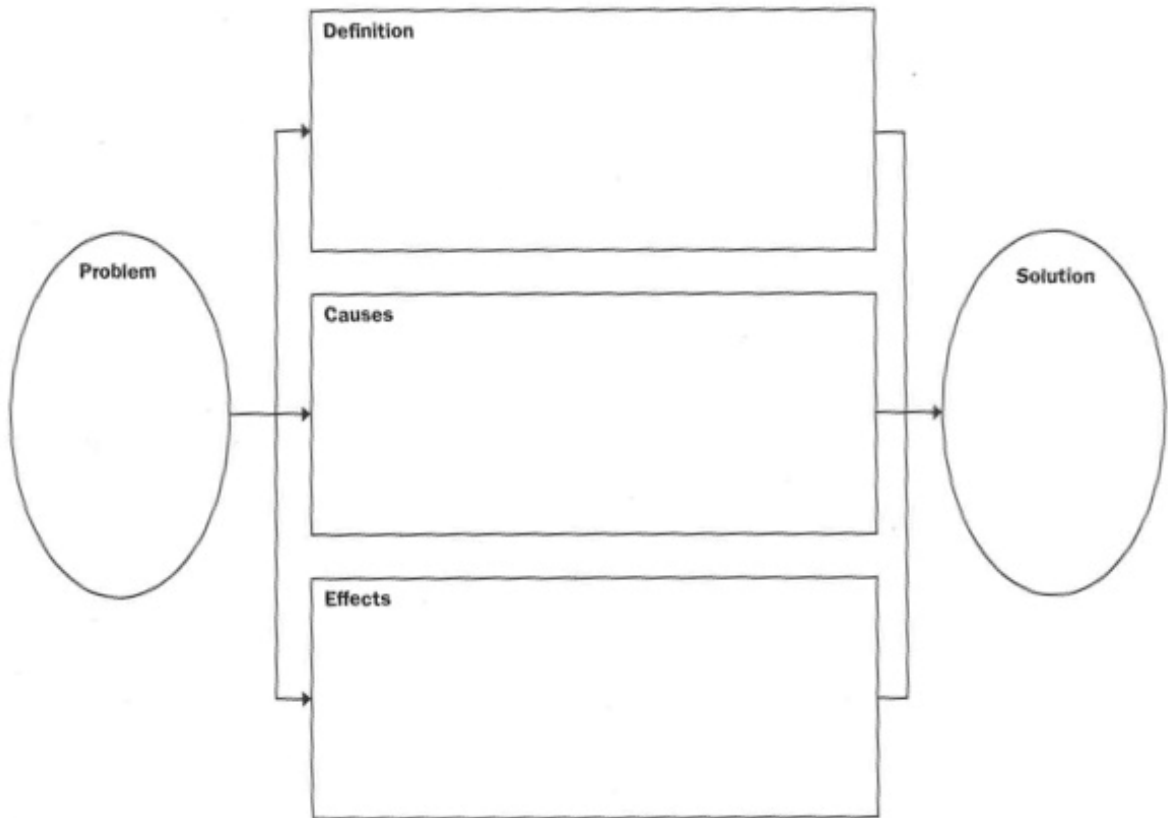
Lesson Information and Activities				SI Strand(s)
Name	Genre (e.g., narrative)	Level	Connection to Sts (What will this mean to them? How can you make it even more meaningful?)	
Acidifying Salsa	Lab Simulation	HS	Students explore a real-world problem (balancing food pH to prevent contamination) using a game-like format and a popular food item, salsa	
<p>Estimated Time: 2 class periods (45 minutes each)</p> <p>Language Domains: x Reading x Writing x Listening x Speaking</p> <p>Grouping: <input checked="" type="checkbox"/> Independent Work <input checked="" type="checkbox"/> Pair <input type="checkbox"/> Small Group <input checked="" type="checkbox"/> Whole class</p> <p>Reason for grouping: <input checked="" type="checkbox"/> First language <input checked="" type="checkbox"/> English proficiency <input type="checkbox"/> Reading level <input type="checkbox"/> Content understanding <input type="checkbox"/> Interest <input type="checkbox"/> Other:</p> <p>Preview: Connections to past learning or the larger unit sequence</p> <p>Previewing activity:</p> <ul style="list-style-type: none"> • Pass a jar of salsa around the room. • Ask students if they have ever made fresh salsa, or do they purchase it in a jar? • What are typical ingredients? (elicit tomatoes, onions, peppers, cilantro or spices). • Where would those items fall on the pH scale? (refer to previous lesson's concepts/pH scale) • Ask a student to find the expiration date on the jar. Look at ingredients, how does salsa last that long? Discuss how adding acidic ingredients (e.g. citric acid) affects food sources. • Guide students to understand that acidic ingredients can protect food from dangerous toxins produced by organisms like <i>C. botulinum</i>, which is a common and harmless microbe in the environment but deadly when sealed with food in a jar. <p>Presentation: Primary activity steps associated with lesson implementation Differentiation, scaffolding, modifications, strategies employed, interaction activities, materials integrated that function to shelter language and content for the EL students</p> <p>Start the simulation from http://virtuallabs.nmsu.edu/salsa.php projected to the whole class, pause and ask:</p> <ul style="list-style-type: none"> • What is the problem? • Why is it a problem? • Who will be affected by this problem? • Are there any obvious solutions? <p>Distribute the Problem-Solution Map – See page 7</p>				
				MODIFY
				APPLY

Lesson Information and Activities		SI Strand(s)
<p>Have students identify problem, definition, cause and effect. Discuss their ideas for solutions – there are more than one “right answer”-- and then continue simulations using their own computers with partners. Students can record the final solution from their virtual lab into their charts. (Note- students have a choice at one point to add lemon juice or vinegar, which is why final data and solutions may vary.)</p> <ul style="list-style-type: none"> • CLOSURE <p>Directions: After you complete the salsa simulation lab, fill out and submit the exit ticket below describing what you learned about acidic ingredients and their role in food safety.</p>		
3	<p>Your grandmother wants to make salsa and also can the vegetables from her garden to store for the winter. Write three things you would tell her to do to make sure she cans her foods safely. Use your chemistry terms!</p> <ol style="list-style-type: none"> 1. 2. 3. 	
2	<p>Share two things you learned about chemistry lab equipment from this experience.</p> <ol style="list-style-type: none"> 1. 2. 	
1	<p>Did this virtual lab change your views about eating homemade salsa or other canned/preserved foods? Explain in one sentence.</p>	
<p>Connections/Extension: Conduct a hands-on laboratory experience that complements the virtual lab, providing the opportunity for students to gain real-life experiences and a greater understanding of the applications of STEM for food safety scientists.</p> <p>Assessment: activities for formative and summative assessment during and after primary lesson activities. How does assessment account for the language demands embedded in core content for ELs?</p> <p><u>Students will be assessed through a range of tools including:</u></p> <ul style="list-style-type: none"> • Previewing activity responses • Questioning • Monitoring progress on Problem-Solution map • Listening to conversations with peers • Exit tickets 		

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Lesson Information and Activities	SI Strand(s)
<p>How are parents, families, and the community invited into or associated with the content, delivery, or extension of this lesson?</p> <p>This lesson draws on funds of knowledge students bring with them to this country, such as traditional methods of canning and preserving foods. Many students will have cultural foods that are similar to salsas but may consist of other ingredients, and they can share this information with the class. Students are asked in their exit ticket to prepare tips for their grandmothers, and this may encourage conversations at home.</p> <p>A food scientist could be invited to the class as a guest speaker, either in person or Skyped in, to answer questions from students about careers in this field.</p>	<p><u>CULTIVATE</u></p>

PROBLEM – SOLUTION MAP



Education Connections' Four Strands of Sheltered Instruction

Sheltered Instruction is an approach that makes academic content, as well as language development, more accessible for EL students. The Education Connections activities are based on **Four Strands** of Sheltered Instruction. They are: Define, Modify, Cultivate, Apply.

Define

- **Develop, define, refine, communicate, and assess *content objectives* for every lesson**
- **Develop, define, refine, communicate, and assess *language objectives* for every lesson**
- **Ensure objectives derive from, and are aligned with, English language proficiency (ELP), as well as content standards**

Modify

- **Differentiate instruction through lesson adaptation and instructional modifications**
- **Scaffold instruction in response to students' individualized language and content learning needs**
- **Identify the language demands and domains embedded in lessons and explicitly address language use and needs for both teaching and learning**

Cultivate

- **Explicitly identify and acknowledge the **cultural competence, human capital, knowledge, experiences, and resources students bring to the classroom****
- **Invite parental and/or familial involvement in the school and classroom and make connections that extend beyond the core curriculum**
- **Support native language maintenance, additive bilingualism, and biliteracy development**

Apply

- **Directly promote language use through interaction with peers, teachers, as well as the core content**
- **Encourage and facilitate language use in both English, as well as students' home languages**
- **Develop and implement activities that require use of all four language domains**