Seattle University - EDLS 3100 Lesson Plan Template

Mentors and Candidates: Please meet to discuss completion of this document before the lesson is taught.

Name: Sara M. and Laura S.	**Date of Lesson:** 11/14/2019 and 11/21/2019
School: E Elementary School	**Subject:** Science
Grade Level: 5th grade	**Duration of Lesson (minutes):** (1:35 – 2:15 PM)
Classroom Context: Mrs. M's class: ● 27 students. ● 2 ELLs ● 2 Advanced Learners ● 6 really low students who need a lot of attention/assistance/direct instruction.	 Mrs. C's class: ● 26 students ● 3 ELLS ● 3 students with IEPs

1. Learning Targets, Evidence of Learning and Assessment: What will my students learn?

- UNIT

What is the central focus for the unit that contains this lesson? (e.g., persuasive writing - Language Arts or 2-digit addition – Math)

Science- Nature of Engineering. In this unit, students will continue to learn and explore the Nature of Engineering, parts the
Engineering Design Process, and its practices.

- LESSON

Focus: What is the main idea of this lesson?

This lesson will help the students start thinking about whom engineers are and what they do by walking them through a problem an engineer might face: improving a lemonade.

Purpose: Why is this lesson important for students to learn/experience?

This is important for students to learn because the engineering process guides the engineer through steps to find solutions to problems. By students following the engineering process, they can experience engineering practice and learn what engineers do.

Instructional Objectives

Using the table below, record the teacher's instructional objectives, evidence of learning, and assessments. Instructional Objectives must be classified as facts (*Students will know…)*, Concepts (*Students will understand…*), or Skills (*Students will be able to…*).

Standards	Instructional Objectives (Fact, Concept, Skill)	Evidence of Learning (student behavior)	Assessment(s)
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved	Students will be able to improve a formula for a Mexican lemonade. (Skill)	In groups, students will work together to improve a lemonade.	Students will turn in a suggestion about how to improve their lemonade.
	Students will be able understand what engineers do and how they find solutions to problems (concept). .	Students will describe what they learned about engineers and how they solve problems.	Students will complete an exit slip.

Learning Targets:

Write 1-2 student-friendly learning targets (I can + [active verb] + [topic] + [learning product]).

I can…

I can use engineering practices to improve a lemonade with the material given and complete my exit slip.

- Consider and describe anticipated misunderstandings students may demonstrate related to the learning target(s).

-Students might not know what engineering practices are. This will be explained by relating to students the observations they made on the Egg Drop Challenge (with what makes the best design to protect an egg from breaking when dropped), their most recent project with the Toymaker, or their parachute activity (where students had to design the best kind of parachute for a toy). Scaffolding students to think of what steps they took to arrive at the best design for their project.

- Given what you know about the classroom context and your learners, how have you designed instruction that is responsive to their skills, interests, and cultural and linguistic assets?

-We do not know much about the students, but we will be circulating to assist struggling groups of students during the whole process. This is also a pretty hands on lesson so the students who learn better through doing the activity will be supported in that respect. We have also asked that the students be put in groups where they will best be able to succeed.

2. Materials and Resources: What do I need to effectively teach this lesson?

- Identify all materials and resources needed for this lesson.

A lemonade with almost no sugar.
Copies of the lemonade formulation
35 Small cups to give some lemonade to the students.
16 Copies of handout (one per group)
70 Exit slips (one per student)
Small cups with 1 gr of sugar each and 1 ml of lime juice
12 oz water bottles with caps (to shake and dissolve lemonade ingredients).

3. Implementation of the Lesson: What will students and I *do* during the lesson? How will I support students to meet the learning target(s)?

Describe below each part of your lesson. Focus on identifying the Elements of General Lesson Design (Anticipatory Set, Sharing the Learning Targets/Purpose, Preparing for Instruction, Check for Understanding (throughout), Closure). In addition, label and describe your instructional steps, drawing on what you learned about Explicit Instruction and Productive Group Work. You may add boxes to account for additional activities if needed.

Time Location Grouping	Lesson Element	What the teacher does and says	What the students do and say
1:35 – 1:45 STEM room Whole group	Anticipatory set/ engage (Laura)	Welcome students into the classroom and invite them to take a seat. -Introduce yourself to students. -Today we are going to be talking about engineers. Write LT on the board: **"I can use engineering practices to improve a lemonade with the material given and complete my exit slip**." (CFU) - I know that here at E Elementary you all have done some engineering projects like the "Egg Drop Challenge," the activity you did with making parachutes, and when building toys with the Toymaker. -What are some things you learned about engineering through those activities? (Turn and talk, then share with the class). Write student responses on whiteboard -One thing **that engineers do is solve problems**. In all of those activities there was	Students walk to the classroom Students share their ideas. Some students' answers might be: collaborate, build models, do research, solve problems, work within constrains)

		a problem you wanted to solve. Like with the egg drop, you needed to figure out how you could build a container that would keep the egg from cracking when dropped from high up. Today, our problem to solve is that we will have a party and a friend gave me a recipe for my lemonade.	
1:45 – 1:50 Whole group discussion	Prepare for instruction (Laura)	-**Another thing engineers do is collaborate and use knowledge we already have to inform their designs.** We want to work as engineers to improve this lemonade. - What are the possible problems a lemonade may have? For example, my lemonade can be too sweet (write the idea on the board). - Make a list with students' ideas about problems lemonades could have. - Now, ask students for solutions of those problems. For example, if my lemonade is too sweet, what could I do to fix it? I will need to add more sugar. Go over all the options the students gave to find solutions. -If the students do not come up with this idea, explain to them that when you do lemonade with limes, you should always dissolve the sugar before the limes. Otherwise, the sugar will not dissolve. - I have this lemonade. I need your help to fix it. What could I do to improve it?	Students share their answers and solutions. For example: Lemonades can be: -Too sweat – less sugar - Too sour – less lemon/more sugar -Too warm: add ice -Too light, no color: more lime/add colorants -Not flavor: more sugar/more lime. Too many calories: less sugar Too expensive: less ingredients
1:50 – 2:00 Table groups	Explore (Sara)	- Give students a list of ingredients and bring a lemonade with little sugar and at room temperature. (If students in the school can try it we can give it some in a small cup). -Ask small groups to give ideas about how to improve it. Each group should write down their ideas. - Once they have their ideas, they will come with the instructors and we will provide the material to produce their own lemonade. If they can, they will test it. - Go over some safety measures and expectations: 1. Listen to the teacher and to each other 2. Report all accidents to the teacher right away 3. Handle the materials and tools carefully (they are not toys)	Students work in teams. They go with the instructors to turn in their suggestions, get the material to prepare their lemonade and prepare one.

		4. Wear safety goggles and gloves when needed 5. No fooling around 6. Safely dispose of materials as instructed by teacher 7. Clean your area and wash your hands after the investigation	
2:00 – 2:10 Whole group/ teams	Explain/Evaluate (Sara)	- Turn and talk with group: Where are some places during the designing process that you saw your group using engineering strategies like these [gesturing to list on the board that was gathered earlier]. Allow a minute to talk then call on some students for their answers:.	Students share their answers.
2:10 – 2:15 Whole group	Closure/Clean up (Both)	- After taking responses and any questions give each student an exit slip to be filled out. [While they work, go around and collect material and lemonades) *What have you learned about how engineers solve problems?* *What questions do you still have?* - Clean-up. Students return any unused material	Students answer their exit slip

4. Flexibility and Responsiveness: What are some options to have available?			
If students…	What will you do?	What will students do?	What are the tools/resources you need?
Finish early	If students finish early, they will be asked to draw a picture of an engineer.	Students can draw a picture of an engineer.	Blank paper and crayons.
Struggle to the point where you need to abandon the lesson	All engineering material will be collected. Students can select one of two choices; reading a book from their classroom library or drawing a picture.	Students read in groups or individually. Students draw a picture of their choice.	-Use books can use class library books. -Blank paper and crayons

4. Assessment: What is the evidence of students' learning?
Describe below the assessment instruments or tools (e.g., rubrics, check list, quizzes) you will use for this lesson.
Students should turn in their design for improvement. Also, the exit slip should have ideas connected to the features of the NOE: Design in engineering. Specifications, constrains, and goals/Sources of engineering knowledge/Knowledge production in engineering/The scope of engineering/Models of design process/Cultural embeddedness of engineering/The internal culture of engineering/Engineering and science.

HANDOUTS:

Group names: _____ Date: _____

Class: _____

What is wrong with this lemonade?

340 mL (12 oz)	**Water**
0.5 gr	**Sugar**
2 mL	**Lime juice**

Improve: D**escribe** (write down or draw) an improved design. **Label** all the materials needed and quantities.

Exit slip

Name: _____

Date: _____

Answer the following questions:

1. What have you learned about how engineers solve problems?

2. What questions do you still have?

Name: _____

Date: _____

Answer the following questions:

1. What have you learned about how engineers solve problems?

2. What questions do you still have?