

Sadie Levy

Engineering LAP 4: Building and Trial #1

2/4/19

1. Content: Describe **what** it is you will teach. What is the content?
 - a. In this 3-part lesson, students will be going over how to work in groups, the beauty of failing in the design process, and starting to build and test their own designs. The elongated lesson will span over the course of the morning meeting, read aloud, and our allotted engineering lesson time.
 - b. During morning meeting, we will write on post it notes to start brainstorming ways to work in teams, and also learning the new vocabulary word “compromise.” Afterwards, we will read Rosie Revere Engineer to spark a conversation around “beautiful flops” to start preparing ourselves for the possibility of a let down in our first model. Later in the day we will start building our first models in the same small groups from last time, and then begin to test them using small bears as weights.

2. Learning Goal(s): Describe what specifically students will **know** and **be able to do** after the experience of this class.
 - a. SWBAT work collaboratively in their teams and practice team-building qualities of Engineer (they listen, they take other people’s ideas, they wait until everyone has spoken to start building or drawing).
 - b. Students will choose materials that make sense to make their boat.
 - c. Students will follow their group sketch plans to create one boat.
 - d. Students will be able to partake in a group discussion of what it means to be a team-builder.
 - e. Students will understand the importance of beautiful failures (just like Rosie Revere) that students understand the beauty of mistakes.

3. Rationale: Explain how the content and learning goal(s) relate to your Curriculum Unit Plan learning goals.
 - a. This is a very important lesson in the CUP. The conversation around group work is one that has been a long time coming. Due to snow days, this conversation got moved all the way to the 4th lesson, when it really would have been better fit for the second lesson, but everything in this unit is a learning process, and I have no doubt that the conversation, wherever it is placed, will have a deep and important impact on the function of the groups. Reading the Rosie Revere book in this lesson is a critical part of practicing disappointment and failure, and in preparation for later on in the day when we begin to build. Following our classes design cycle, we will build our first models and begin to test them. I don’t want the 3rd portion of the lesson to go too much over 50 minutes, so if students are not done in that time, we will finish in the following lesson.

4. Assessment: Describe **how** you and your students will know they have reached your learning goals.
 - a. All students will complete the worksheet in their Engineering Journals on their first trial which includes a sketch that is labeled, the number of bears the boat held, how long it held for, and a writing portion on what they think could be improved. I will also ask students to reflect on their group cooperation that day by having them add at the bottom of their sheet a print-out for self and group assessment. (Unlike last time, they will do this individually so I can get a sense of how each student is learning and reflecting).
 - b. I will be also observing student behavior throughout the lesson to see how students are including one another, listening, and showing respect. This, as well as their participation in the building and the questions they ask will determine how well I see them being a part of this lesson.

5. Personalization and equity: Describe how you will provide for individual student strengths and needs. How will you and your lesson consider the needs of each student and scaffold learning? How specifically will ELL students and students with learning disabilities gain access and be supported?
 - a. Like with all of my lessons, I am trying to create the lesson around those who need the most support, so that this lesson can truly be accessible to everyone. Because this lesson is discovery-based, I can imagine that students may not have some of the vocabulary they need, but my hope is that through tangibly discovering and touching the materials, they will develop a closer relationship with what the materials actually are for before they know a name for their properties. It is also through this process of talking about the materials and discussing how to build that my ELLs are getting more oral practice time, which is something we stress the importance of in 380 with Carmen. Another goal for accommodating all students in this lesson, especially those with special services, is to be very explicit and clear with my directions. My intention is to have them work together in groups and create a boat - I would hate for my unclear directions to get in the way of that, so my words will be intentional and as clear as possible so as to include everyone in the class.

6. Activity description and agenda
 - a. Describe the activities that will help your students understand the content of your class lesson by creating an agenda with time frames for your class. Be prepared to explain why you think each activity will help students on the path toward understanding.

time	activity	rationale
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PART 1		
10-15 min	<p>Morning meeting: What does it mean to be a team builder?</p> <ul style="list-style-type: none"> - As a class come up with anchor chart which we can refer back to later about how we can be positive members of a team - Give out each student a post it note and write down one thing they're looking forward to with the project - post the post its on the board - Then talk about how we can make sure that all happens and brainstorm on chart paper - what does team work and group work look and sound like? <ul style="list-style-type: none"> - compromise - (Share your brilliant ideas, but they might have to shift a little. Give Naliya's example from the other day). 	<p>Later on in the day we will be working in groups to build our first boat model and it is imperative that students have a great understanding of what working in a group looks like. Especially for the Chino, Naliya, Sara group - I am hoping that this review will remind them that working in a group can sometimes be challenging, but we grow when we are challenged to see things in a new way.</p>
PART 2		
20 minutes	<p>Read Aloud after morning meeting of <u>Rosie Revere Engineer</u></p> <ul style="list-style-type: none"> - Rosie is an inventor; she is creating things - What happens? Her uncle Fred was laughing at her so she stopped creating things - she has the ask when she's lying in bed: "Could she build a gizmo to help her aunt fly?" - vocab: perplexed, dismayed, Python, 	<p>We are reading this book with a female protagonist to encourage all people to follow their dreams, no matter their gender! This book is also very fitting for our project of building later in the day because some of their first models might not work as initially intended, and that's okay! Rosie Revere's aunt reminds us that the "brilliant first flop" is just a way to see what <i>did</i> work, and then focus on what to fix!</p> <p>same as above</p> <p>↓</p>

5-10 minutes	<p>Discussion of Rosie Revere</p> <ul style="list-style-type: none"> - Reminder that it's okay if your first trial fails! That is part of the process. How will we ever get better if we never fail? - "The perfect first try! This great flop is over. It's time for the next!" - "Your brilliant first flop was a raging success!" 	
	<p>Add words in to vocab sheet in journal:</p> <ul style="list-style-type: none"> - compromise: When you change an idea a little so that you can agree with someone - collaborate: work together - engineer: a creator. Someone who creates or changes things to make our lives easier - design: to create or make something 	
PART 3		
	<p>reminder: This boat has a purpose which is to FLOAT and HOLD WEIGHT. (don't get caught up in the pretty details)</p>	
	<p>Write up objective We will work in groups as team-builders. We will pick materials that make sense for this boat-making challenge.</p>	
5 minutes	<p>Get into groups and review the plan and sketch</p> <ul style="list-style-type: none"> - Take out the materials you need - Make sure the space is clear - Make sure everyone knows 	<p>It is important that groups first have a set aside time to go over verbally the plan, make sure their working space is prepared before they actually start building. This will avoid some conflict if all members are on the same page before starting to build</p>

	the steps of how the boat is going to be built (what's first, second, etc)	
	For groups that are having issues starting/agreeing/collaborating, give them the sheet of paper for delegating roles	
	Reminder: we may not have time for everyone to test today. Just focus on getting a model done and then we will hopefully test a few.	
20-30 minutes	Start building! (If your group is having a hard time working together, we'll talk).... aka give them the Team Roles piece of paper	
15-20 minutes	<p>Start testing! Kind of on a rolling basis</p> <ul style="list-style-type: none"> - The first group to finish everyone will stop what they're doing to watch the process: - Put the boat in the water (in a pan I bring in) and see if it floats. If it floats, students will take turns dropping plastic bears into the boat. - Then all students will observe what is happening without touching and see what could be improved. - Then students will go back to their engineering journals to record data (how many bears, for how long) 	At least for the first boat finished, it will be helpful for <i>all</i> students to have an example of the procedure. This way, as the rest of them start to finish, they will all have an idea of what is going to happen so I don't have to repeat myself 6 times.
10 minutes	As time allows, groups can start planning and sketching for their next model, making sure to label the new materials and note what they're changing	

- b. What particular challenges, in terms of student learning or implementing planned activity, do you anticipate and how will you address them?

Overall, I anticipate students will be engaged and excited for this project, so will not have a hard time focusing or showing engagement. I do, however worry that students will get off task and be so concerned with minor details that they don't focus on the main challenge.

Another concern of mine is the groupings. So far, the only group that had a challenge was Chino, Naliya, and Sara. My hope is that after the conversation in the morning, they will be able to work more smoothly together. If it seems like it is really not working, I will ask Naliya who she thinks she could work better with (since I saw her doing the most work in the team to try and compromise to be able to work with Chino). Not each boat is going to be a success, so I will also try and remind them that, no matter what, they will learn something about designing and engineering.

7. List the Massachusetts Learning Standards this lesson addresses.

- a. (science engineering) K-2ETS1-3. Analyze data from tests of two objects designed to solve the same design problem to compare strengths and weakness of how each object performs.
- b. 2-PS1-1. Describe and classify different kinds of materials by observable properties of color, flexibility, hardness, texture, and absorbance.
- c. 2-PS1-2. Test different materials and analyze the data obtained to determine which materials have the properties that are best suited for an intended purpose.
- d. listening/reading in standards Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
 - i. Follow agreed-upon rules for discussions.
 - ii. Build on other's talk in conversations by linking their comments to the remarks of others.
 - iii. Ask for clarification and further explanation as needed about the topics and texts under discussion.

8. Reflection

- a. In light of all areas of planning, but especially in terms of your stated purpose and learning goals, in what ways was the activity(ies) successful? How do you know? In what ways was it not successful? How might the activity be planned differently another time?
- b. What did you learn from the experience of this lesson that will inform your next LAP?

Overall, I think this lesson went pretty well! The students were very excited about building their boats and I was pleasantly surprised with their ability to work together, especially

Chino and Naliya's group. My structure of including morning meeting and read aloud into the lesson I think was really helpful for the students to focus on just a few central points: it's okay to have fails the first time ("beautiful flops" as we called them, From Rosie Revere Engineer); in a group we can *compromise*; the focus of our boats is to float and hold weight. As I teach more and more I realize the importance of honing in on a *few* key details that will make the lesson go smoother. Although there are so many important components to teamwork, I picked *compromise* as the word to focus on for this unit, and I think it was helpful for both my students and I to have one word (along with our other teamwork vocabulary words that we already know) to keep coming back to.

Despite the high level of engagement, there was also a lot of great feedback to implement in my upcoming lessons.

Points to consider with regard to my round questions.

- Although part of the lesson is designed with discovery in mind, could there be a specific focus on vocabulary in the lessons to come? A word wall, perhaps? As Carmen noted in her round reflection, "For example, Ashley knew she wanted popsicle sticks 'because they don't get wet and they don't wrinkly and they get dry' - it sounded like she wanted to say 'sturdy' - this highlighted the importance of English vocabulary and how and when to introduce it."
- It seems like part of the issue with following directions and really commenting on the materials used was accuracy of scientific drawings. Maybe implement a minilesson on accuracy in the lessons to come?
- After the students tested their boats, I noticed there wasn't really a specific place to record what the *problem* was. In my head, there would be a mental note of what went wrong and then they would record how to fix the problem, but I think writing down what exactly the issue was could have really benefited many students. The second time we test, I have them circle on their original drawing what were the problem spots.
- It seemed like once the students put their boats in the water they started putting their bears in, there was some ambiguity as to when the boat was no longer floating. In the next round of testing, I will be sure to slow down this bear process, and really focus on the moment when water starts to seep in or the boat sinks low enough to the bottom of the pan.

Positives

- High engagement overall! Students were excited :)
- Evidence of the use of the vocabulary and skills learned from the morning. Many of my observers said students could be heard using explicit terms from the morning and the anchor charts. This is explicitly related to my round question, "Were there instances of students using the phrases we went over in the morning to facilitate listening and ease in a group setting?"

- Regarding students working thing out together, Liz noted a couple specifics of students saying things like “Let’s work this out together;” I have an idea,...;” other students reminding each other of their stated purpose - to float and hold weight
- I was proud of myself for asking the question, “Do you have any doubts?” when they went up to test their boats because I think it required them to really think about what they may have faltered on.
- At the same time, I was also proud of students’ ability to take risk and the culture which I had created which honored “beautiful flops” and risk taking. Many people commented on this in their written and verbal reflections to me. This is directly linked to the Rosie Revere Engineer read aloud we had done that morning.
- Something that Mary has also commented on for me is my physical placement in the room - am I located in a way that I am available and have an eye on all students? I think the way I moved around so much and checked in with every group showed this growth.
- Overall, management was another huge plus. I was conscious of my wait time and holding high expectations for that silence in the room before I give direction.

The last part of my lesson was not completed with the other educators in the room, but was an important part of this lesson for me to check in with how students were feeling about their boat and in their group. The exit slip was intended to be low-stakes, and I think creating this as such allowed me to have a small window into how they’re feeling about this overall project. There were only a couple students for whom I think the rubric on the exit slip did not make sense, and their responses reflect that.

These first few responses were essentially what I expected and made sense to me:

Prince and Astrid were in the same group which is interesting to see their responses, although I’m not surprised. Although many of the responses vary greatly, almost all of their self-assessments of how they compromised as a group are reflective of what I observed of their reality, which makes me think they truly did understand what it meant to compromise.

Name: Prince

I feel frustrated about the boat we created today.
(circle one of the words below)

good okay amazing bad pretty fine
frustrated sad so excited angry

	not very much	sometimes	almost all of the time
We listened to each other		X	
It was fun being part of this team		X	
We compromised when we had to	X		
I think I got along with people in my group			X

Name: Astrid

I feel okay about the boat we created today.
(circle one of the words below)

good okay amazing bad pretty fine
frustrated sad so excited angry

	not very much	sometimes	almost all of the time
We listened to each other		X	
It was fun being part of this team			X
We compromised when we had to		X	
I think I got along with people in my group			X

Name: _____

Naiya

I feel happy about the boat we created today.
(circle one of the words below)

good

okay

amazing

bad

pretty fine

frustrated

sad

so excited

angry

	not very much	sometimes	almost all of the time
We listened to each other			✓
It was fun being part of this team		✓	
We compromised when we had to			✓
I think I got along with people in my group			✓

Name: Sara Hexha

I feel so excited about the boat we created today.
(circle one of the words below)

good okay amazing bad pretty fine
frustrated sad so excited angry

	not very much	sometimes	almost all of the time
We listened to each other			✓
It was fun being part of this team			✓
We compromised when we had to			✓
I think I got along with people in my group			✓

Name: Keziah

I feel amazing about the boat we created today.
(circle one of the words below)

good okay amazing bad pretty fine
frustrated sad so excited angry

	not very much	sometimes	almost all of the time
We listened to each other			X
It was fun being part of this team			X
We compromised when we had to			X
I think I got along with people in my group			X

Mario and George's on the other hand, I'm a little perplexed by. I spoke with Mario after I saw that he had checked off all positive things, but said he felt sad by the boat he created. It just didn't seem to add up. When talking about it more, this is what he changed it to. I'm not sure if

the last row of the rubric is a reflection of his dislike of he team members, or just a disliking of working in groups in general.

Name: MANIC ANGELO

I feel _____ about the boat we created today.
(circle one of the words below)

good okay amazing bad pretty fine
frustrated sad so excited angry

	not very much	sometimes	almost all of the time
We listened to each other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It was fun being part of this team	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We compromised when we had to	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think I got along with people in my group	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I think George really did understand this rubric and was just all over the place with his thoughts.

Name: George

I feel _____ about the boat we created today.
(circle one of the words below)

good okay amazing bad pretty fine
frustrated sad so excited angry

	not very much	sometimes	almost all of the time
We listened to each other			X
It was fun being part of this team			X
We compromised when we had to	X		
I think I got along with people in my group			X