Next Gen PET

Teaching and Learning Extension N

Obtaining, Evaluating, and Communicating Information – Preparation for TL Lesson 9

Purpose

This activity includes four sections.

1. Video Analysis Guide. This includes instructions for how to access the videos and questions to guide your observations.
2. Transcript of the two videos
3. Reading about NGSS Practice 8: Obtaining, evaluating, and communicating information

In this activity, you will watch and analyze two short videos. You will also read about NGSS Practice 8: Obtaining, evaluating, and communicating information.

You should take notes on the videos, guided by the provided questions, and read the description of NGSS Practice 8 prior to beginning Lesson 9 in class. Bring your notes and the description of NGSS Practice 8 to class.

Video Analysis Guide

You will be watching two videos. These videos are of Lessons 2 and 4 of a four-lesson unit of Engineering is Elementary called *A Work in Process: Improving a Play Dough Process.* In this unit, elementary school students take on the role of chemical engineers and decide on criteria for assessing the quality of play dough and create a written description of the process they determine creates the highest quality play dough. This set of lessons can be adapted for a range of age levels. We will watch Lesson 2 in a kindergarten classroom and Lesson 4 in a 5th grade classroom. All four lessons that the children participate in are described below.

Lesson 1 (**not** required to view): In the first lesson of their unit, the elementary school children listen to a story about a character named Michelle who wants to teach other people how to make play dough. Michelle and her Uncle Adam work on figuring out a process for creating play dough.

Lesson 2 (required viewing—kindergarten): In Lesson 2, students learn to conduct product research by polling consumers (children in another classroom) about their preferred color of a new type of juice. They also report their findings to a fictional

company president. This lesson focuses on communicating information. In this case, they are communicating information about their findings in a letter. (Link: Get the Creative Juices Flowing (Kindergarten))

Lesson 3 (**not** required viewing): In Lesson 3, children examine high and low quality play dough and determine criteria for high quality play dough including things like how well it can be shaped and whether it is sticky or not.

Lesson 4 (required viewing—5th grade): In Lesson 4, the students develop and modify a process (or recipe) for making play dough. Their modifications are based on what they know about the states of matter. (Link: Improving a Play Dough Process (Grade 5))

Kindergarten Lesson 2
Watch the video of kindergarten students participating in Lesson 2 of the chemical engineering unit. This video shows children engaged in product testing.

The video can be found here: Get the Creative Juices Flowing (Kindergarten)

The transcript is provided at the end of this activity.


How did the task that kindergarten students were engaged in set up the need to obtain and communicate information?


Describe some specific ways that the teacher supported the kindergarten students in communicating information? You may want to look for things like tables that helped organize data to show trends, parts of sentences that students had to finish (called sentence frames), and verbal supports to the students.

Fifth Grade Lesson 4

Watch the video of 5th grade students participating in Lesson 4 of the chemical engineering unit. This video shows children engaged in communicating ideas.

The video can be found here: Improving a Play Dough Process (Grade 5)

How did the task that the 5th grade students were engaged in set up the need to obtain and communicate information?

Describe some specific ways that the teacher supported the 5th grade students in communicating information.

What are some differences that you noticed between how the teacher helped kindergarteners communicate information and how the teacher helped 5th graders communicate information?

Obtaining, evaluating and communicating information is just one of the eight science and engineering practices. In the table below, all eight practices are listed. You can review a description of any of the eight practices that you do not remember (or did not discuss in your Next Gen PET Class) in Extension A. Choose at least **two** practices (other than Practice 8) and describe how the children are engaged in that practice and provide a reference to the place in the video clip. You may use examples from either or both videos.

Practice	Description	Video Reference
1. Asking questions (for science) and defining		

problems (for engineering).		
2. Developing and using models.		
3. Planning and carrying out investigations.		
4. Analyzing and interpreting data.		
5. Using mathematics and computational thinking.		
6. Constructing explanations (for science) and designing solutions (for engineering).		
7. Engaging in argument from evidence.		
8. Obtaining, evaluating, and communicating information,		

Reflect on your own learning

Think back on your own science learning experiences, both in this class and your experiences in elementary school, high school and college through now. Consider what you think makes *good* science teaching.

In TL Lesson 10, in class, you will be considering how your ideas about science instruction have changed over your Next Gen PET course.

If your class completed TL Lesson 1 in class, look back on your notes to the first question in Part 1. That question also asked you to consider what you thought made good teaching. Write down your original response (copy your response from L1) here. If your class did **not** do TL Lesson 1, think about what you *might* have considered to be good science instruction before you began Next Gen PET.

Choose 4 of the NGSS practices and describe specific examples from Next Gen PET when you engaged in the NGSS practices of science and engineering.

Practice	Description
1. Asking questions (for science) and defining problems (for engineering).	
2. Developing and using models.	
3. Planning and carrying out investigations.	
4. Analyzing and interpreting data.	
5. Using mathematics and computational thinking.	
6. Constructing explanations (for science) and designing solutions (for engineering).	

7. Engaging in argument from evidence.	
8. Obtaining, evaluating, and communicating information.	

EiE Classroom Video: Lesson 2: A Work in Process: Improving a Play Dough Process/ Grade Kindergarten

https://youtu.be/FwENFvL8d6I (Note: Video does not match transcript, as it is from a different classroom.)

[00:00:24.07] Teacher: Okay boys and girls, do you remember how in the story Michelle had an uncle and her uncle Adam was a chemical engineer? Does anyone remember what chemical engineers do? Kelsey?

[00:00:36.24] Kelsey: They make stuff.

[00:00:41.23] Teacher: They make stuff, but they use what they know in chemistry and math to help create something that's going to solve a problem. Well, we're going to do a little activity today. How many boys and girls ever drink juice? Give me a thumbs up if you drink juice. Raise your hand if you have a favorite kind of juice. Jaydee, you like orange juice. Jayce, what's your favorite kind of juice?

[00:01:07.12] Jayce: cranberry

[00:01:08.14] Teacher: Cranberry juice. How do you decide what kind of juice is your favorite?

[00:01:15.00] Student: I drink fruit juice and I like it.

[00:01:16.15] Teacher: You drink something that you like, right? Are you going to drink cranberry juice if you don't like cranberries?

[00:01:21.25] Student: No

[00:01:22.23] Teacher: No. Okay, so here I have a problem for you. I have something we're going to listen to. So I need everybody's hands down.

[00:01:29.00] [Plays recording] Hi, my name is Jenny. I am a chemical engineer and I work for creative juices company in the product research department.

[00:01:38.09] Teacher: so this is the Creative Juice Company and what do they make? Addison?

[00:01:43.02] Addison: juice

[00:01:44.18] Teacher: They make juice. She wants you to do some product research. Now listen because she's going to explain what all of that is, but you need to pay attention.

[00:01:51.23] [Recording] Product research means finding out what consumers like about a product and what they don't like. Today, I need your help doing some product research on a new juice flavor that creative juices has decided to sell: strawberry orange juice. This new juice is made for kids just like you and we are trying to figure out what color juice consumers prefer.

[00:02:18.18] Teacher: So what does she want you to do? She needs your help to do what today? Daren

[00:02:21.26] Daren: Make strawberry orange juice.

[00:02:26.22] Teacher: Well, they're making strawberry orange juice. That's a new juice. But what does she need your help with? April?

[00:02:30.24] Student: Make a juice

[00:02:31.25] Teacher: Deciding what about the juice, Addison?

[00:02:34.18] Addison: to make the color.

[00:02:36.06] Teacher: deciding what color the juice should be. And it's going to be for kids just like you. So listen.

[00:02:44.10] [Recording] Once you have conducted your product research and determined what color the consumers prefer, you should write a report to the president of creative juices company, telling her what you have learned.

[00:02:55.29] Teacher: They need your help. You have to help us come up with a color that you think boys and girls would like to drink if they saw strawberry orange juice. So, let's come up with some ideas. What do you think might be some good colors for the juice? Think about what color. Now watch, I'm going to draw a strawberry up here. Think for a second. What color juice do you think we could make. Annalise?

[00:03:31.11] Annalise: Pinkish orange. Peach.

[00:03:35.11] Teacher: Oh so peach. You think it should be a peach color?

[00:03:39.23] Annalise: Yes

[00:03:40.23] Teacher: Melinda, what color juice do you think we should could make?

[00:03:45.06] Melinda: green

[00:03:45.06] Teacher: green? You think you'd want to drink a green juice? Okay.

[00:03:45.06] Teacher: green? You think you'd want to drink a green juice? Okay.

[00:03:48.21] Teacher: We're going to try and mix some of these colors together. Let's take our colors here that we came up with. Peach, red, green, blue, and brown and see if we can make the color and decide if that's good or not. We have to come up with just three. I'm going to mix the colors and show you what it looks like. I'll hold

up the cup when I make the color. I want you to be able to see what the colors are so that you can decide what colors you want. We'll start with six. Here we go. Let's start with just the regular colors. Let's try blue first. You guys thought that blue would be a good color for the strawberry orange juice.

[00:04:36.02] Student: It looks like a blueberry.

[00:04:36.02] Teacher: It does a little but. So, do you think this would be a good color for strawberry orange juice if it's blueberry? Let's just do the regular colors first. Okay here we go. This is red. Um another color you said was green. Okay so let's try some green. If you think it needs to be darker green, give me a thumbs up. So lets add some more green. Alright. So that's the blue, the red, the green. Now somebody said pink. My question is -- this is what it looks like when we get red. Does anybody know how we make pink? Addison, how do you get pink? What colors do you have to mix together? Red gets mixed with what? White. No we actually mix it with white. Cause you actually want red to get lighter. So I don't know how we'll make pink, but we'll try maybe just add one. We don't have white - that's the problem. Maybe if we just add one, we could get a light red. Maybe that would be a good color. I don't know, let's see what this gets us.

[00:05:49.15] Students: Pink!

[00:05:49.15] Teacher: Is this the pink that you're talking about?

[00:05:51.02] Students: yeah!

[00:05:51.15] Teacher: okay, so if we just added one drop of red, then you get a pink color. So I've got yellow here. If you think it needs to be darker yellow, give me a thumbs up.

[00:06:03.18] Teacher: You guys are talking about the color peach. Peach is sort of like an orangey color. So let me see if what we get if we mix a little bit of yellow and a little bit of red together. You guys said peach. So let's see what we can mix together, red and yellow, that's going to give us a peach color that you're thinking of.

[00:06:36.04] Students: peach!

[00:06:38.17] Teacher: Is that orange or is that peach? Raise your hand if you think it's peach.

[00:06:39.03] Students: Peach!

[00:06:41.17] Teacher: Is this the peach color you're thinking of?

[00:06:44.25] Students: yeah.

[00:06:46.06] Teacher: So you like that peach color?

[00:06:47.12] Students: yeah

[00:06:52.00] Teacher: Are there any other colors of our juice that you think you might like? So we've got peach, we've got pink, yellow, green, and blue. So here's what we're going to do. You have to vote. I'm going to call you up one row at a time. I'm going to give you my marker and you're going to put a tally mark under the color juice that you would like strawberry orange juice to be. Straight line is a tally mark okay. Go put your tally mark next to the color you want.

[00:07:24.28] Teacher: So if we had to do this I think we would look at peach and pink and red and blue would be the colors that we need to do. So we're going to make some bottles of juice - or bottles that are the right color so we got to make sure we get these bottles the right color. When we made pink, does anybody remember what color we used when we made the pink. Kelsey, do you remember what we used when we made pink?

[00:07:55.26] Kelsey: Um, red.

[00:07:58.21] Teacher: red. Do you remember how many drops we used.

[00:08:01.03] Students: one.

[00:08:02.01] Teacher: Okay, so we used one red. Do you think - when we get the big bottles, we're going to have to decide how much of each color we're going to use to make it be the color we want. These are the three colors we came up with - pink, peach, and blue. And you know what? Mrs. Shaffer's boys and girls are going to help us decide which one is going to be the color that boys and girls would like most for their juice. We're going to mark them with letters - A, B, and C. And I'll mark these [bottles] with letters so when they come and look, they can see A, B, and C. And they can help us decide which color they would like for some strawberry orange juice.

[00:09:00.13] Teacher: We have three colors here for you. We've got color A, color B, and color C. And you are going to help us decide which color you think would be the best color for strawberry orange juice. Tell them what they're going to do. I'm going to give them.

[00:09:29.03] Student: the marker

[00:09:29.03] Teacher: and what do they have to put up on their favorite juice or which juice they think is going to be the best.

[00:09:33.05] Student: the line

[00:09:34.24] Teacher: we're going to make tally marks.

[00:09:37.01] Student: like if they like the blue or the pink or the peach.

[00:09:39.10] Teacher: okay, A, B or C. So you're going to come up and I'm going to call you one at a time, or one row at a time, and you're going to come up and put a tally mark to tell us which juice you think - which color juice you think would be the best color for strawberry orange juice.

[00:10:07.18] Teacher: Alright boys and girls, thank you so much. Let's look at what we found. When Mrs. Shaffer's boys and girls came in here, how many of her boys and girls liked color A? Jovelle, count for us.

[00:10:17.16] Jovelle: 1, 2, 3, 4

[00:10:20.29] Teacher: 4 okay so we had 4 boys and girls that liked juice A. How many boys and girls liked juice B? Addison?

[00:10:30.09] Addison: 5, 6, 7, 8, 9.

[00:10:35.27] Teacher: nine boys and girls liked color B. What about color see, Luis, how many?

[00:10:44.20] Luis: 1, 2, 3, 4.

[00:10:49.26] Teacher: 4. Good job. Nice counting. Very good. 4 liked color A, 4 liked color C and 9 liked color B. So, we are going to have to tell the president of the Creative Juice Company that nine people - those boys and girls, most of them liked the color B that we created. So here's what we're going to do. We're going to write the Creative Juice company a letter. They asked us a question, right? They asked about the color juice that we needed the most. We imagined and created some juice colors. So now we need to tell them what we found. Let's go over what we did yesterday. Um, do you remember that we heard from Jenny and Jenny worked for the creative juice company. And she gave us a problem that she wanted us to solve. Do you remember what that problem was? Zachia?

[00:11:51.02] Zachia: strawberry orange juice.

[00:11:55.16] Teacher: What about the strawberry orange juice? What did Jenny ask us to do with the strawberry orange juice? What was the problem she needed our help with.

[00:12:03.25] Student: the color

[00:12:05.17]Teacher: Jenny asked us to help. They wanted to come up with a color - what color would be the best color for their orange juice. But Jenny needed our help because she wanted us to do some research -- some product research, right? And we came up with some colors - these were the three colors that we came up with - that our class thought were the best three colors for the strawberry orange juice. And like Zachia said, Ms. Shaffer's

class came down to help us and they made some tally marks for us to tell us which color juice they thought would be the best for the strawberry orange juice. Now. How many boys and girls liked pink? How did we know that this was the one they liked the most? JD, how did we do that?

[00:12:49.04] JD: So many people said the pink.

[00:12:53.01] Teacher: So many people. They came and put tally marks on and we counted them and saw that nine people liked this pink colored juice.

[00:13:03.02] Teacher: So this says, "Product Research Report." When you do research you have to write a report to tell people what you found. So it says, "To the president of the Creative Juice Company." Who is it from? This says "from." Who is this letter from? From Miss Vaness's -

[00:13:20.05] Students: classroom.

[00:13:20.05] Teachers: Okay, so let's do that. Look number one says "the purpose of our product research was to find out -" what do we need to find out, Kelsey? Help me finish what this should say.

[00:13:32.16] Kelsey: to find out what color juice it has to be

[00:13:40.03] Teacher: What color the strawberry orange juice should be. The consumers or the people, the children, that we surveyed are ages -how old were these people? How old were these children? Addison?

[00:13:53.20] Students: five or four

[00:13:56.01] Teacher: Five to six, I think, right?

[00:13:57.23] Student: yeah

[00:13:58.05] Teacher: Five to six. We surveyed a total of 17 people. We added up all of these numbers and we said there were 17 students in Ms. Shaffer's class. We have to put in some numbers here, look. It says, "how many consumers preferred juice color A?" How many people liked juice color A? 4 consumers. Consumers are people would buy that and that's what those students would be - they would buy that juice. How many preferred juice color B? Nine. Nine preferred juice color B. How many preferred juice color C? Anaya?

[00:14:44.09] Anaya: 1, 2, 3

[00:14:45.00] Teacher: What number is that?

[00:14:45.10] Anaya: four

[00:14:45.11] Teacher: four. "Based on the results of our product research, we recommend that you make your new juice" what color?

Belinda? A, B, or C? B. And then we need to tell how many or what our formulas were for each color. How many colors or drops of color we put in there. We had to do some product research. Do you remember when Michelle and her uncle did their research? What were they researching?

[00:15:21.21] Student: playdough

[00:15:23.22] Teacher: right, the best recipe to get the play dough. And they came up with their process. And that's what - this is the beginning. They did research - or Michelle did research with her dad to come up with the best play dough recipe and now Michelle and her uncle were going to come up with a recipe that everybody could use.

[00:15:43.06] Teacher (interview): Working in groups I really enjoy with EIE. It makes them learn how to get along and deal with other people's thoughts and opinions. I think when they look at things as a process and not just as an end product, they can actually see the steps they need to go through to actually come to final ending of whatever it is they're doing. Um, some of the students are understanding it more and I think if we would do another lesson, maybe in the Spring, I would like to see the difference between what they do now and what they do in the springtime. Because, I do think a lot of them will understand the process of problem solving more than getting the end product.

EiE Classroom Video: Lesson 4: A Work in Process: Improving a Play Dough Process/ Grade 5

This transcript is for a video that is part of the online resources for the Engineering is Elementary (EiE) curriculum. The video can be found online at

https://youtu.be/wQlaBpHA3XA

[00:00:23.29] Teacher: What did Michelle use in order to solve her problem? Teresa?
[00:00:27.01] Teresa: The engineering design process.
[00:00:29.11] Teacher: The engineering design process. Exactly. So we're going to use the engineering design process again today. Okay. we've used parts of the process along the way. A process. What did we say a process was? Jaden?
[00:00:44.25] Jaden: Something that you do step-by-step to get to the finished product.
[00:00:49.27] Teahcer: Or goal. Okay. the goal, okay. So it's a set of steps that we're going to follow to achieve a goal. So we have here a process. A process is a series of steps that we are going to - to get to our design goal. So one quarter plus one quarter. You know fractions, right? equals what?
[00:01:15.07] Students: one half
[00:01:15.16] Teacher: one half. Okay. And add the water to the bowl. Alright so this is what we were talking about before when we said adding. What states of matter do we have?
[00:01:35.20] Student: solids and liquids.
[00:01:35.20] Teacher: Solids and liquids, thank you. Okay. What's our next step next?
[00:01:43.16] Teacher 2: Measure a quarter cup of salt. Use your hands to knead for one minute.
[00:01:49.00] Teacher: Does this look like high quality?
[00:01:52.05] Students: No
[00:01:52.27] Teacher: no.
[00:01:57.04] Teacher: When you used the store bought, did you get this?
[00:01:56.12] Students: No
[00:01:57.28] Teacher: no.
[00:01:58.29] Teacher: And it if it's a low quality, what's the possible score?
[00:02:01.25] Student: two

[00:02:02.21] Teacher: two. Do you think if we change the materials it would be better?
[00:02:11.19] Students: No.
[00:02:11.19] Teacher: No. What do you think we could do to improve? Morgan?
[00:02:14.23] Morgan: We can add more or less of it.
[00:02:17.23] Teacher: Or so you're saying we could change the amounts. When you mix water with the flour, you told me, sometimes you get a solid, sometimes you get a liquid. What happens when you mix the water with the salt? What did you observe when you mixed the water with the salt? Teresa?
[00:02:33.10] Teresa: It was still a liquid. And it was very - It wasn't clear at all it was kind of - it looked kind of like fog.
[00:02:42.27] Teacher: What happened to the salt? Nice description.
[00:02:42.27] Student: It kind of like dissolved.
[00:02:48.03] Teacher: It dissolved.
[00:02:52.27] Teacher: So in the boxes below, you're going to write some ideas about how you would improve the process.
[00:02:54.02] Student: I just want to see happens if you add salt, water, and flour all at the same time.
[00:03:00.08] Teacher: Okay. That's a brainstorm idea.
[00:03:02.18] Student A: My first idea is we should add -
[00:03:07.11] Student B: More flour
[00:03:07.11] Student A: yeah. maybe a little tiny bit more flour because if you add too much flour it will become too dry and it will fall apart.
[00:03:17.11] Student B: I think we should add a tiny bit of flour and water.
[00:03:19.22] Student A: Okay. But we're adding the flour because we're trying to get rid of the stickiness from the water.
[00:03:26.07] Student B: So less water.
[00:03:28.06] Student A: So a little bit more flour
[00:03:30.15] Student B: More flour, less water
[00:03:34.27] Teacher: I just made it to several of the groups and as I went along, several of the groups - I was very very impressed with how people were sharing and taking turns sharing. Noah, you had a really interesting idea about the combination of things. Would you share it with the class.
[00:03:47.23] Noah: I wanted to see what would happen if you added salt, water, and flour at the same time.
[00:03:52.09] Teacher: so he wants to add them all at the same time. So your process would definitely change.

[00:04:01.27] Teacher: we have asked questions, we have imagined what can we do to make that happen? Now we're going to come up with a plan. On this page, what you're going to do. You're going to use your other information. You can use your observations, and you're going to cut out the steps just like I cut out the steps of the process. But you're going to put it in the order you want here. You're going to put it in the order that you think would make it the best process to achieve your goal of making high quality play dough.

Groups working

[00:04:39.17] Student: One, two, three, four

[00:04:45.18] Student: Five, six, seven. Then, five six seven.

[00:04:47.01] Student: Like how much?

[00:04:50.13] Student: Add half again.

[00:04:52.13] Student: Yeah, if you add too much then like Steff said, it's going to end up grainy.

[00:05:06.02] [Shows example of student process]

[00:05:08.00] Teacher: So Taylor has started her new and improved process. And this is what it's looking like. So when she's done, I'm going to give her group - you're going to work with the same partner you had yesterday - and you're going to test your new process. So you're going to get a kit just like yesterday. Get a basin and the things in the basin. You have your three materials. You have your flour, salt, water. What state of matter is this [holds up water]

[00:05:36.23] Students: liquid

[00:05:37.06] Teacher: liquid. And you're going to get an empty one. Okay. This is your spoon for stirring. Then you have your one quarter measuring cup and your craft stick to square off so you have an exact amount.

Group working

[00:05:53.02] Student: For the flour, we did add a half extra tablespoon of flour so do I do this and then that?

[00:06:03.21] Teacher: this is a quarter cup and this is one tablespoon. And what do you think that mark in there? If you look in there and see the label. One quarter. Yeah exactly, that's half. Awesome.

[00:06:14.14] Teacher: You can barely move it. I'm glad you're smiling. So what's the consistency?

[00:06:21.10] Student: [unclear]

[00:06:21.10] Teacher: It's what you said?

[00:06:25.27] Student: Remember how I told you yesterday about

[00:06:27.12] Teacher: yes.
[00:06:27.12] Student: Flour and maybe two water - just to make more.
[00:06:30.14] Student: Two teaspoons.
[00:06:32.06] Student: Add one extra tablespoon of water. Well, 13, 14, 15, 16, 17
[00:06:42.21] Student: 38, 39, 40, 41
[00:06:45.17] Student: the first time we did it, it came out like mashed potatoes. So we started adding more stuff. So we added salt and we added a little bit more water.

Whole class discussion

[00:06:56.28] Teacher: Okay, so everyone have a seat. I'm seeing lots of interesting things going on. Jordan, tell us what's going on at your table.
[00:07:04.08] Jordan: What's happening at ours - we changed a little bit.
[00:07:09.29] Teacher: so you had this process, but when you followed it, you followed the new and improved process.
[00:07:15.10] Jordan: Yeah. But it got us to wet dough. Like really wet and you couldn't feel any dough at all. It was just wet.
[00:07:20.15] Teacher: So when you were going to do the usage test and the texture test
[00:07:24.28] Jordan: It was wet.
[00:07:25.29] Teacher: You couldn't even do the test, so what did you go ahead and do?
[00:07:30.00] Jordan: Well we added like-
[00:07:34.11] Teacher: What? You went ahead
[00:07:35.19] Jordan: yeah
[00:07:35.19] Teacher: and added
[00:07:37.01] Jordan: yeah
[00:07:37.13] Teacher: What step is that?
[00:07:38.20] Jordan: Improve?
[00:07:40.22] Teacher: You were going to improve it?
[00:07:44.19] Jordan: Yeah
[00:07:44.19] Teacher: Do you see how this is a process? Once you start going, it keeps going on and on. You're not done. Okay. Now before you do that? What's really important like right now that you remember what you changed. Write it down.

Small groups

[00:07:59.02] Student: We added more flour because we thought the one we had was too sticky so we tried to add more flour to make it more dry.
[00:08:12.03] Teacher: So what is it you changed?
[00:08:14.21] Student: We're gonna cross off some of that and add some of that because we subtract water.

[00:08:23.20] Teacher: Okay, so cross that off so that you know you didn't do that. You need to keep a good record of what changes you made.

Whole class

[00:08:29.05] Teacher: I am so excited at everything that I'm observing. I see people that are having difficulty. They're like "oh my gosh this is like - makes no sense" okay. They are ready. But they didn't give up. They had perseverance. They immediately went to improve things. But the next step is what? What did you tell me we had to do? on your next two on your data packet, okay? you have a texture test. And you have a usage test. I want you to grade or test for the snowman test and for the texture test.

[00:08:53.06] Student: And how about we do

[00:09:15.23] Student: A three for the texture. A three. So the total is six.

[00:09:24.07] Teacher: So, you're telling me that, if we come up with a process here. With this whole process, if it's good, you can take it home and you'll get the same results at home that you get here.

[00:09:34.06] Student: If we do it right.

[00:09:34.06] Teacher: perfect. So are you achieving your goal?

[00:09:37.08] Student: Yes.

[00:09:42.25] [Image of written worksheet]

[00:09:49.05] Teacher: So Morgan, tell us what was easy for your process.

[00:09:50.00] Morgan: I think it was better when you add more flour.

[00:09:56.24] Teacher: your particular process. Okay. Because why?

[00:10:02.03] Morgan: Because it makes it more like. It makes it less sticky.

[00:10:08.00] Teacher: Less sticky

[00:10:08.00] Morgan: It makes it like if you have the same amount of flour and water, it's not easy to manage it.

[00:10:21.09] Teacher: Who can tell me, what parts didn't work so well? Oh look at all the hands go up on that one. What did not work so well? Terrin?

[00:10:27.29] Terrin: We thought maybe if we put too much flour in cause it was really dry. We tried adding more water, but-

[00:10:37.14] Teacher: That being said, you guys had success with improving. Then you had frustration with what you thought was going to happen. Why is it important to add the amounts?

[00:10:49.29] Student: It's important to add a certain amount because you wouldn't want the dough to be too rough or too wet. You want it to be easy to be molded.

[00:11:02.02] Teacher: How many of you think that using the engineering design process, it would be easy to come up with some kind of plan or invention? Okay. Nice job.

Practice 8 Expectations

Obtaining, evaluating, and communicating information

"Any education in science and engineering needs to develop students' ability to read and produce domain-specific text. As such, every science or engineering lesson is in part a language lesson, particularly reading and producing the genres of texts that are intrinsic to science and engineering." (NRC Framework, 2012, p. 76)

Communicating scientific information takes a variety of forms including writing, speaking, and creating tables, charts, and diagrams. These are essential practices for students to learn to convey their ideas. They must also be able to obtain and evaluate scientific information from other sources such as the media.

Below are the grade level expectations for elementary school students from the Next Generation Science Standards.

Grades K-2 Expectations	**Grades 3-5 Expectations**
Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information. • Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s). • Describe how specific images (e.g., a diagram showing how a machine works) support a scientific or engineering idea. • Obtain information using various texts, text features (e.g.,	Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Read and comprehend grade-appropriate complex texts and/or other reliable media to summarize and obtain scientific and technical ideas and describe how they are supported by evidence. • Compare and/or combine across complex texts and/or other reliable media to support the engagement in other scientific and/or engineering practices. • Combine information in written text with that contained in corresponding tables, diagrams, and/or charts to support the engagement in other scientific and/or

headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim. • Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas.	engineering practices. • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. • Communicate scientific and/or technical information orally and/or in written formats, including various forms of media as well as tables, diagrams, and charts.