Chapter 2 CHEMCO Video Case Transcript

CHEMCO-1

[00:00]

Ms. Gallagher: Okay. All right, now lab activity 2, the movie is a little slow here, but I'm going to start it and talk at the same time. No, I do not film every lab that you do so that you can see it later. I've done it here for the first time, for this first lab so that we can review to see whether or not my results match the results that you guys found. Now remember there were two procedures. The second lab activity had you first putting some <inaudible> and ice water in a petri dish and adding six drops of each substance on either side, okay, at the same time, and then we waited and we looked. We looked at the results. Now, I did it twice and I got two different results. Now, I'm not talking about the second procedure. I'm saying I put those chemicals on either side of the petri dish two different times. The first time I got this funky kind of curved blob system going on with the yellow forming wherever it wanted it seemed like. Did any of you have that happen for the first procedure? Okay, one group. Okay, now here's the second time I did it with both chemicals at the same time. My result was kind of a nice, yellow line in the middle, any group get that as a result? Okay, nice. How many groups got yellow for a product? Yellow, something yellow? Excellent, all six groups. So, what might have been the reason? Everyone focus on the first activity. What might have been the reason for that line to form in one and the blob to form and the circular thing to form in the other?

Kelly: We got a line and blob.

Angie: We got a big blob.

Kelly: What? Like two blobs in the center and a line going through them?

Ms. Gallagher: Okay, and do you remember the directions, what it said about the water once you put the water in there?

Students: Don’t touch it.

Ms. Gallagher: And so if you put the chemicals in before the water settles or the vibrations on the lab table from someone leaning down to write something. That may have changed what it looked like, okay. But either way we all have yellow. Here's my second result. As soon as I added the second chemical I got a blob, did any group get that? Excellent, what color was the blob?

Students: Yellow.

Ms. Gallagher: Yellow, outstanding, so we all saw the same chemical reaction occur twice, two different procedures, same chemical reaction, so the answer to our first question…

[02:46]

Ms. Gallagher: How do we represent a chemical reaction on paper? What does a chemist do to make it quick? You're going to represent on paper a chemical reaction. What does it look like?

Frank: If you write the equation, you draw the arrow.

Ms. Gallagher: Excellent, an equation, a chemical equation, so let's write the chemical equation for this chemical reaction, okay. What were my two reactants?

Students: Potassium Iodide…Nitrate…Lead 2...

Ms. Gallagher: Lead 2 nitrate and potassium iodide. Those were my reactants. Now what form were they in again?

Student: Liquid.

Ms. Gallagher: Instead of liquid what would you really call it? My bottom is a solid and what did I do to it again?

Frank: They dissolved.

Ms. Gallagher: They were in solution, right? I dissolved it in water, good. So I had two solutions, colorless solutions. They reacted. We saw evidence of a chemical reaction, a new color and a solid formed. Now, I'm going to tell you—first of all, let me ask how many products did you notice?

Mary: One.

Jack: During, during…

Ms. Gallagher: Okay, one probably, right, you saw the yellow glittery stuff. So, guessing that we should write one thing on the other side of this arrow is a good guess. I'm going to tell you that the lead and the potassium actually switch partners so this guy bonds here. What would you call that as a guess? Potassium nitrate, good, potassium nitrate is one product and lead bonded with the iodine what would that be called?

Kelly: Lead iodide.

Ms. Gallagher: Lead 2 iodide, good, lead iodine. Now, which one of those products was the yellow stuff?

Student: Potassium…

Frank: Lead iodide?

Ms. Gallagher: Lead iodide, one way you know that is ’cause that's what it says on the waste container.

Student: Oh!

Ms. Gallagher: Please pay attention to labels. Pay attention to labels. That says lead iodide waste. This was the yellow stuff. Okay?

[05:14]

Ms. Gallagher: Those are observations. Then, you need to draw interpretive pictures. This is where the dots come in. I'm going to—this is an interpretive picture of the first circle we just saw on the last slide. Well, I put water in here. Of course they didn't look like dots to me at the macroscopic level. I'm interpreting stuff so I'm going to say that these are my water particles and that I have 50 of them.

Angie: Do we actually have to count them out when we do our own observations?

Ms. Gallagher: No, but if you are going to communicate a story to someone else make sure the picture matches the words, yeah. And, again this is your drawing so your models just need to make sense. The story has to make sense from beginning to end. On this side I said I put KI. I'm going to put—these are my potassium iodide particles. I looked and I had six of them. These are my lead 2 nitrate particles and I have six of those. Now, I could again…

[06:48]

Ms. Gallagher: So you want to go back and revisit that. This was just a program I got from a Freeware thing that I was playing with to show you this is another way I could have drawn my pictures. Instead of Xs and Os I actually drew the particles that make up my sample so this is where we're headed in the future. And then, again, I wasn't worried about the water so I just drew these little dots to represent the water. And then, whoa, back up. I think I probably need to move the arrow over it. Alright, now I'm not going to see it. Hold on. I'm going to escape and try again. So let's see if it will…over time these particles move. Some of them, the ions separate, some of them meet up and form that yellow solid. So, I had actually four pictures there: before, middle, middle, end. You can draw a lot of pictures to represent the story of what the particles are doing. It doesn't just have to be the beginning and end. That would be up to you guys. Now, conclusions from this lab…

[08:05]

Ms. Gallagher: So, the feedback you're seeing now is all of my classes put together. Now you'll see some things that you know had to do with what happened in here. And you see some things that are at least familiar with what happened in here. I like to give this feedback to all my classes together for a couple of reasons. One is that you all benefit that way. You can grow from each other's mistakes and successes and that the other reason is so that you can see how similar things are from class to class that, you know what, if you didn't know something or there was an accident that occurred it just didn't happen here. It happens everywhere. So, some of the quotes, as I go through the quotes you tell me whether these are good quotes or bad quotes for working

together in lab. One of the quotes I heard was "Hey, don't forget your goggles. We're policing each other you know."

Jack: That's good.

Dan: Good. There's a smiley face.

Chris: Yay!

Ms. Gallagher: That's good and there's a smiley face. And I don't care that you're mocking me as long as you're policing each other. That's fine. "What are you doing?"

Jack: Ooh, bad, that's negative.

Ms. Gallagher: That's negative. Now the question *what are you doing* is an okay question. It's how…

Jack: It's tone. It's the tone.

Ms. Gallagher: It's the tone. I agree. "What the hell, man, get away from me" and then a little shove. And there's like a little shove right after it.

Jack: This is like an easy activity right?

Ms. Gallagher: It's an easy activity, not good. Okay? Be nice. "That's so gay."

Students: Oooh. Oh, no.

Ms. Gallagher: Okay. I'm going to respond very negatively to something like that. It's 2005, grow up. Get that out of your vocabulary please. It is insulting and it's hurtful so we don't use that kind of adjective or those descriptions in here. Next, "Something broke," I heard.

Jack: That's good.

Lynn: Actually, it was like nine of us!

Ms. Gallagher: So, yes, so I asked what should you do? And immediately I get responses like, "Take out your contacts. Get to the eyewash. Run to the nurse. Grab the fire extinguisher." All very funny but false. You don't do any of those things. The first thing you did was correct. You told me. But now what's our response?

Frank: Clean it up.

Kim: Let you know who's hurt.

Ms. Gallagher: First, you check for injuries. First you check for injuries. Did anybody get hurt and you tell me that too. Then you clean it up. Now the how is important. First of all where do we dispose of broken glass?

Lynn: In the broken glass bucket.

Ms. Gallagher: In the broken glass bucket over by the prep room door there's a dustpan and broom and there's a garbage—don't put broken glass in the regular garbage. I would like the custodians to know when they're handling something dangerous. Secondly, you've cleaned it up, what else do you check? Your shoelaces and your pants, I cannot tell you how many glass splinters I've had from something just breaking in front of me. I'll clean it up. Nothing hurt and

I'll go to tie my shoe and a little shard of glass was in my shoelace. It hurts really bad. You need a flashlight and tweezers. It's a whole mess. Check your shoelaces. Check your pant cuffs. Check to make sure that no glass got anywhere else. All right, so that was funny. Another quote, "Do I have a mark on my forehead?" This was a person asking another person while he or she still had the goggles on so the person said "I don't know" you still have your goggles on your forehead. They shouldn't be tight enough to cut off the circulation so that you can't feel them anymore. Make sure that your goggles have a little bit of room so that you know they're there, so be careful. "What should I do," someone asked?

Jack: That's good.

Ms. Gallagher: That's a good question. The response was, "I don't know. Just do what they're doing."

Kelly: Bad move!

Ms. Gallagher: Bad response, really bad response. Okay, this next part is actually all my classes put together with some feedback on how you did with the beginning…I'm sorry…with the mechanics of the room. In the beginning, I took a picture of my lab. I set it up with your equipment. The boxes are nice and straight; chemicals are here. My deionized water bottles are even standing up so you can see them. Another picture from the other side it's all nice and dry. The soap's here. The towels are here. The lab tables only have the syringes on them, nothing else.

Jack: I don't even see any of those wash sponges.

Ms. Gallagher: No, of course not, okay? So this is you guys, all three classes.

<background conversation>

<playing of videotape>

<background conversation>

[13:40]

Ms. Gallagher: Okay, what's the problem with this class?

Student: No one had goggles.

Ms. Gallagher: No one had goggles on, no one. I didn't know who to focus on. Not a single person went back and got their goggles at the beginning of class.

<background conversation>

Jack: Wait. Did you like just say that in the class before?

Ms. Gallagher: I did. I said it this last class but one of the reasons I do such a safe lab at the beginning is this kind of stuff happens. Later on we had some goggles. Not everybody though.

<background conversation>

Kelly: Are we like the last class?

Students: Aaaaah.

Jack: Sorry, guys.

Angie: There's someone's hat on the chair. That means they took it off.

Ms. Gallagher: That's good.

<background conversation>

Ms. Gallagher: At least a couple of people knew they were being filmed.

Jack: Aaaah. That's so cute.

Kelly: I think someone missed the sink.

Dan: It's supposed to be wiped down.

Frank: My bad.

Ms. Gallagher: I could have killed myself.

Kelly: I almost slipped.

Ms. Gallagher: I could have killed myself.

Kelly: I almost slipped back there.

Ms. Gallagher: Okay, this class wins the prize for leaving the lab in the worst condition.

Chris: We also had it last.

Kelly: Yeah, but we win the prize for keeping our goggles on the whole time.

Frank: At least we were safe.

Ms. Gallagher: Yeah, you know, if you were seen without goggles, I missed it.

Kim: I was so proud of us for a while there.

<background conversation>

Ms. Gallagher: So…

Jack: There was like powder. Did we even use powder in the lab?

Ms. Gallagher: Corn starch.

Jack: Oh. Oh.

Ms. Gallagher: So in order to improve I will look obviously every time for improvement in terms of safety but also in how you're working together. Obviously goggles are needed. Desks need to be moved so that that area is free and clear, hats taken off, waste. You need to know where to put your chemicals in the end. Now a lot of you did take your petri disk with the waste, the chemical waste and put it in the waste container that was marked in the fume hood. Is it safe to take a half-a-centimeter-wide petri disk with hazardous waste and carry it like this?

Students: No.

Ms. Gallagher: No. What could you do?

Angie: Bring the beaker to it.

Dan: Put a towel under it.

Ms. Gallagher: Put something underneath it, another beaker, a container of some sort to catch it, or if it's okay, you always want to check, you could take the waste container there, but sometimes the waste container is in the fume hood for a reason so you always want to check. The best bet is to carry something underneath it and obviously with goggles. The fume hood is part of the lab, so yes you should have goggles on when you're over there. Your cleanup. Make sure you focus on that, not just your own lab table but the middle lab table as well. That's the class's area so everybody is responsible for that. And then the number one thing is policing each other. So, if you're at a lab table and you've taken your glasses and my goggles are on top of my head right now and you've done this, or a lot of people with the new ones seem to hang them under their chin, either one of those. The other people at your lab table should care enough about you to remind you, “Hey, get your goggles over your eyes.” I'm more upset with the people who don't say anything than the person who accidentally by habit does something like this or puts them on top of their head. But there's three other people staring at your naked eyes. You need to make sure you're reminding each other to take care and then the other stuff. Everything else goes along with policing each other, cleaning things up, watching out for one another so please keep that in mind. So, there is your class community feedback in terms of safety and mechanics, so you guys should be set for today's lab. You need your tape out.

CHEMCO-2

[00:00]

Ms. Gallagher: Alright, here we go. Somebody tell me what we did last class. Okay.

Kelly: We did an experiment where you put water in a 250 mL flask…200 mL. And then you put 5 mL of acetic acid in the 125 mL flask. And then you connected them with tubes. And then you added sodium bicarbonate, I think, into the 125 mL flask. And that created gas so that the water went to the graduated cylinder.

Ms. Gallagher: Nice description. Okay, a couple questions. Was the chemical reaction part of that activity? What evidence did you see that—yeah?

Lynn: Bubbles.

Ms. Gallagher: Bubbles, okay. Were there bubbles to start with?

Craig: Nope.

Ms. Gallagher: No. So that there were new bubbles. So that meant what was being produced?

Students: Gas.

Ms. Gallagher: Gas, alright. Did all…

[00:58]

Ms. Gallagher: Okay, great. So your homework was to do what?

Jack: Think of a variable.

Lynn: Variables.

Ms. Gallagher: Okay, think of the variables that might alter that particular result. Now before we write all these observations on the board, I want to review real quickly something I said towards the end of class last time. I have guided you through two activities at this point. The first one was petri dish lab and the syringes, solids, liquids, and gasses. And I kind of facilitated our discussion. We talked about conclusions together. We practiced drawing pictures together. Now I'm guiding you through a true experiment, where you've done an initial activity. We're gonna brainstorm variables, you're gonna test them, and present your results. And I'm facilitating that for you. The reason I'm bringing that up is so that you'll focus on the process of what I'm teaching you along with the content. Because you will need to do that on your own without me helping you out very soon. So what we're doing now, all of these skills that we're building are going to be useful for the rest of the year while you work together. So think about the process. What do we do first? Oh yeah. Then what'd we do? How did she say that? Okay. Those things are going to be really important, very helpful for you when I give you another task, another challenge to accomplish, okay? So think about that as we're going through these things. This is, you know, one-time shot that I'm telling you a lot of information, okay? So let's get those

variables on the board. What did you brainstorm? What might we do to change our observed results? Yeah, Jack?

Jack: Well, it was an acid, so you would need a base, which could be baking soda.

Ms. Gallagher: Okay, what is sodium bicarbonate?

Kelly: Sodium plus carbon and oxygen.

Ms. Gallagher: Yeah.

Lynn: Baking soda.

<laughter>

Jack: Oooooh.

Ms. Gallagher: Good for you. And yeah, that's okay. I didn't tell anybody that.

Kelly: Nice job, Lynn.

Ms. Gallagher: So instead of the acetic acid and the sodium bicarbonate, we might use some other chemical. So, different chemical. What else?

Jack: You learn something new everyday.

Ms. Gallagher: Um, yes, do you go by Tarianna?

Tara: Tara.

Ms. Gallagher: Tarianna. Tara! I'm sorry, is that what you just said? I didn't hear the ending. Tara, go ahead.

Tara: Uh, the concentration of acetic acid?

Ms. Gallagher: Good. And we haven't talked about what that really means, okay? You all have an idea of what the word *concentration* means, but in the back of the room I prepared a solution of acetic acid for you. What does it say on the label?

Students: One molar.

Ms. Gallagher: One molar. Okay. We're using molar….

[03:50]

Ms. Gallagher: So perhaps we can change this concentration, and we might get a different result. What else?

Kelly: Amount of water.

Ms. Gallagher: So in that middle flask? The amount in middle flask. Actually I don't like using the word *amount* if we have an actual measurement for it. What word would we use there instead of amount?

Kelly: Quantity.

Ms. Gallagher: What quantity? How were you measuring it?

Students: Millileters.

Ms. Gallagher: Millileters, so volume. Volume of water in the middle flask.

Jack: So like a different substance besides water.

Ms. Gallagher: In the middle flask?

[04:28]

Ms. Gallagher: Mass of baking soda. What else?

Lynn: I don't know if this would work, but you could change where each of the…where each thing was, like the water not being in the middle flask.

Ms. Gallagher: So reversing the system?

Lynn: Right.

Ms. Gallagher: Um, is that testable? Try to picture it. 'Cause we're trying to push something from one direction to the other. So yeah, we can't test that one.

[05:02]

Ms. Gallagher: Concentration of acetic acid, and where is it? Mass of sodium bicarbonate. What else? These are amounts of chemicals kind of. What else could you change besides the acid?

Student: You could change the types of chemicals.

Ms. Gallagher: I think I have that…different chemicals?

Jack: You could change the state of the chemicals?

Ms. Gallagher: Do you mean phase?

Jack: Yeah.

Ms. Gallagher: No. I mean, you could, but no, we don't have the ability. Yes?

Kim: You could add to the concentration of the sodium bicarbonate?

Ms. Gallagher: You know what, good guess, since we haven't talked about that. It might not make sense, but it's a solid. That is what it is. Can't do anything about that. But let's think about the liquid. What did you put in the 125 mL flask?

Student: Water.

Student: Acetic Acid.

Ms. Gallagher: How much?

Students: Five grams.

Ms. Gallagher: Five— mL.

Dan: So just change the amount of the volume.

Kelly: Didn't we already put that into one of them?

Ms. Gallagher: Did I already write that? No. Volume of acetic acid. Let me look. How much time do we have? 11:30, okay. Anything else…

[06:15]

Ms. Gallagher: Good question. We need to make sure we have a control. So let's write next to these things what we're going to do for all of these descriptions, and everybody will be doing those same things. What will we use as a reference for that? How will we decide on our control? What reference can you look...

Dan: The sheet that we got last time.

Ms. Gallagher: Yeah, the sheet that we got last time, the initial activity. So are we gonna use different chemicals as our control?

Kim: No.

Ms. Gallagher: No, okay. Concentration of acetic acid, what do we want our...

Dan: One molar.

Ms. Gallagher: One molar. Volume of water in the middle flask.

Jack: 200.

[06:55]

Ms. Gallagher: Right after you put the acetic acid and then the sodium bicarbonate in, did you do anything to that container besides put the stopper on?

Tom: I think we mixed it.

Ms. Gallagher: Yeah, I shook it, didn't I? Why would I do that?

Dan: To quicken the reaction.

Ms. Gallagher: Okay, why would that make them react faster?

Students: Mix.

Ms. Gallagher: Okay. So instead of the sodium bicarbonate being in a big clump, what happened to it?

Students: It distributed. It spread out.

Ms. Gallagher: It spread out, which means I increased...

Student: Surface.

Ms. Gallagher: The surface area, so that the acetic acid could touch more of those particles. Now the clumps, the way you put that acetic acid in there—the sodium bicarbonate in there is gonna probably make a big difference. Like some people will pour it in slowly and it'll move around; other people are going to pour it in quicker, and it'll get a big clump down there. So we probably want to make sure that sodium bicarbonate gets spread out. How're you going to control that from group to group? What could we all do?

Student: Shake it.

Ms. Gallagher: So describe what kind of shake we're all going to do.

Students: Side-to-side. Swirl.

Ms. Gallagher: Okay, I see swirls and I see side-to-side. Which one do you want to do?

Students: Swirls!

Ms. Gallagher: The swirl? Okay. Anybody? How many swirls?

Students: <several suggestions> five, four, three, four-and-a-half

Jack: And you want to like stop it…you will be like…and then set it down.

Ms. Gallagher: Okay, you have to then demonstrate the swirl for us.

Dan: No you gotta get up.

Ms. Gallagher: So everybody can see. 'Cause if you're doing four-and-a-half.

<Jack stands up to demonstrate. Class counts.>

Students: One.

Ms. Gallagher: Okay, now hold on. Are you holding the whole container and doing this, or are you...

Student F: No. Just kind of going like this…

[08:33]

Ms. Gallagher: Three trials of that test. Now we need to pick the variables that're going to be tested. There's six groups in the room, so we're going to, as a class, test six variables. Now remember, in the end, you are going to present your findings about your variable to the rest of us. And the purpose is so that everyone in the room is really comfortable with what's going on in this lab. And I will then challenge you. Okay, now that you've presented to each other, go make this happen. So you want to pick variables, tests that you can run that might actually help you understand this lab. Yeah?

[09:15]

Ms. Gallagher: It'll represent all of them. So give me some ideas. Which six variables do you think might help you understand the lab?

Kelly: The concentration of the acetic acid.

Ms. Gallagher: Okay, so here's one idea. What's another idea?

Tom: Temperature.

Ms. Gallagher: Temperature, where did I write that?

Kim: It's on the other side.

Ms. Gallagher: These? Both of them? You know, this one's really gonna be hard to change, don't ya think, the solid.

Tom: So just that.

Ms. Gallagher: So, okay. The temperature of the acid?

Jack: Volume of water in the middle flask.

Ms. Gallagher: Okay.

Student: Volume of the acetic acid.

Ms. Gallagher: Volume of acetic acid. One, two, three, four. We've got four, we need two more at least. Give me two more.

Kelly: Placement of chemicals.

Ms. Gallagher: Placement? There's an idea. Whoa, in the back, Rita.

Rita: The mass of the sodium bicarbonate.

Ms. Gallagher: The mass right here? Okay. What else?

Jack: That's six.

Ms. Gallagher: That's six, but are those your best?

Frank: Yes, ma'am.

Ms. Gallagher: Or are there any people that believe that maybe we should trade on in?

Adam: Size of flask for chemical?

Ms. Gallagher: Instead of?

Adam: Placement of chemicals in flask.

Ms. Gallagher: This one instead of this one.

Students: <noises indicating disagreement>

Frank: Yeah, 'cause the reaction is still gonna happen.

Ms. Gallagher: I mean, aren't we swirling?

Mary: Yeah, let's do that one.

Frank: It doesn't really matter.

Ms. Gallagher: This one you're saying, right?

Frank: Yeah.

Ms. Gallagher: I think I agree with you.

Frank: The reaction's like still gonna happen. It's not gonna change.

Ms. Gallagher: So, you—this one?

Dan: Well, if the reaction's not going to change then what's the significance of putting in the order of the…

Jack: What about the first lab? Remember we had the drops and we waited for so long? And it was a completely different outcome. So that's the same problem.

Ms. Gallagher: Okay.

Frank: No, but you still got the yellow powder, it just depended where the drops went.

Kelly: But it was a different—like it was...

Frank: Like for this it's still going to produce the same gas, 'cause it's still is the same two chemicals.

Dan: Yeah, but we're thinking of how the amount of gas affects the how there are differences so…

Ms. Gallagher: Great discussion. You guys all have good ideas. There was a third thought though. The circled ones. There was a third suggestion.

Kelly: I was going to say something about the volume of the water in the middle flask.

Ms. Gallagher: Okay, hold onto that. Let's decide on this first.

Kelly: Oh, okay.

Ms. Gallagher: Okay? Yes.

Robert: The type of liquid.

Ms. Gallagher: The type of—wait, where is that? This one, thanks. This one right here. Instead of water, something else?

Kelly: I don't think the volume of water matters.

Mary: Yeah, the volume of water won't matter...

Ms. Gallagher: This one?

Kelly: I don't think it would matter at all.

Dan: I think that we should keep it the same and focus more on playing with the chemicals.

Student: Yeah.

Jack: But it's a transfer of water.

Kelly: It's just water that's just transferring.

Jack: Yeah, I know but when you only have so much water…

Ms. Gallagher: Okay, so you guys need to decide at this point, because we gotta get back there. I'm gonna leave these starred four variables alone.

Jack: I don't like the temperature.

Ms. Gallagher: Okay, I'm gonna leave those alone. You need to in your head right now think about which one of these four—wait, two of those four—that you think would be the best tests. Raise your hand when I call on it. Volume of water in the middle flask—one, two, three. Different liquid in the middle flask—18. Size of the flask for the first flask, the 125—8. And placement of the chemicals, the order—one, two, three. Obviously all didn't vote. So we're going to do this one, and this one, and not these two….

[13:30]

Ms. Gallagher: The size of the flask for the first flask? No? Okay. One. Two. Three. Four. What's next? Temperature of acetic acid.

<Four hands enthusiastically go up.>

Ms. Gallagher: Okay! This group. And what's the last one, volume of acetic acid?

[13:54]

Ms. Gallagher: Now how're you going to present? So let me go through an example presentation. Yes, you want to write this down, and then you're going to get back in the lab, and start. Okay?

[14:07]

Ms. Gallagher: For each slide there's a main idea. And the other thing you want to think about is as an observer, okay? One of the groups in the room is presenting their information to you. You're listening to them. You should be thinking, "Does it make sense?" And if not, "What questions should I ask at the end to make it make sense. So that's how you want to observe one of these presentations. So first of all, for the Chemistry Concoctions lab, my name's Ms.

Gallagher. I tested—does the type of music played in the background of the room affect the amount of water collected in the graduated cylinder? That is my variable.

[14:48]

Ms. Gallagher: In the beginning, I have the acetic acid on the left, with the sodium bicarbonate. The middle flask with 200 mL of water, and an empty graduated cylinder on the right. When the chemicals started to react, I noticed bubbles in the left. The volume of the water in the middle flask started to decrease. And the water in the graduated cylinder increased. And in the end, I ended up, the results you saw in my chart was a measurement of the volume of water in this cylinder. Okay, and all of those tests had similar results.

[15:29]

Ms. Gallagher: Your explanation should include a chemical equation to represent the chemical reaction you're observing in that first flask. The data analysis discussion proves you have a firm grasp of what happened in lab, and that you've created a workable model to explain it the rest of us. You're testing your variables so much, gathering so much data that you will be the expert in reference to your variable. You'll know more than I do. 'Cause you're testing it. So you will be the class experts about that test. Okay? So you need to collect enough data to prove to us that you know what you're talking about.

[16:12]

Ms. Gallagher: For my graph on the *y* axis I have the volume versus my variable. The volume versus my variable. This is the volume in the graduated cylinder that I've collected, and the four different types of music that I tested.

[16:33]

Ms. Gallagher: And then, in conclusion, the analysis of my data indicates that the type of music does not affect the amount of water collected from the chemical reaction between sodium bicarbonate and acetic acid. Does anyone have questions? That's how you should end your presentation, "Does anyone have questions?" So at this point, had you been listening to me, critically listening to me, none of that should've made sense. You should have a host of questions for me. Okay? So as you're listening to other groups, you want to be thinking about the questions you're going to ask in order to make it make sense. It's not putting anyone on the spot.

As a class you're all trying to figure this out, okay? If we had more time, I'd let you throw out questions to me.

[17:26]

Ms. Gallagher: Okay? So it's just a sample presentation to help you get ready for what you're going to have to do for the class next Thursday. So you will have the rest of today, and Tuesday to collect your data, and get ready for your presentation; first thing on Thursday you're presenting. The requirements for your presentation. Everyone in your group must present. So I should hear everyone's voices.

Nick: So we just need one presentation for each group?

Ms. Gallagher: For your group. So we'll see six of them total. One for their group, one for this group, one for yours, one for this group. So there's gonna be six presentations.

[18:10]

Ms. Gallagher: If you do choose to use PowerPoint for your visual aids, you must, your group, must email it to me by midnight the night before. So that's midnight Wednesday night. Okay, if I don't get it by midnight Wednesday night, then you have to do something else for your visual aid. Okay, 'cause I want to get those files on my desktop, so we don't have to waste time logging in and out or waiting for disks to come up, etcetera.

[18:39]

Ms. Gallagher: The other stuff, what you're testing, your variable, you want to do a number of different tests. Each test, three trials. It's gonna take some time to gather this stuff. So let's say you're doing volume of acetic acid. That group might decide, Okay, I'm gonna do 5 mL three times. That's our control, but then let's do 1 milliliter three times. Let's do 10 mL three times. Let's do 3 mL. Let's do 20. They'll decide what their tests are going to be. A suggestion for all of you is to do some extremes if you have a continuous variable, so that we can see some sort of pattern. So do a couple of extremes, and then kind of meet in the middle to see whether or not there's a pattern that develops.

[19:27]

Ms. Gallagher: Shift your desks into your groups and get your data table ready to go first.

<Students quickly shift desks to form groups of four. Ms. Gallagher begins to go around to each group.>

Ms. Gallagher: Okay, temperature. You've got hot plates which is much safer than using a Bunsen burner. The hot plates you don't want them to go above "four." It means that "one" will boil water actually. If you see bubbles forming in your acetic acid so that it's getting hot enough to boil, stop. Remove it with the tongs off of the hotplate 'cause we don't want to boil our acetic acid.

Kim: Do we have thermometers?

Ms. Gallagher: Yeah. So I was just going to say that in your data table you won't be able to right now put exact numbers. You just know that you're gonna want to at least go hotter than room temperature maybe a couple. So you'll take the temperature of that sample right before you add your sodium bicarbonate and that will be one data point. Now it will be hard to match that exact temperature a second trial and a third trial. That's okay. Just get as many as you can. But remember you can always go colder.

Tom: What if we did three at a time so that we got the same temperature?

Ms. Gallagher: That's a great idea. Try it. Excellent idea.

[20:53]

Craig: We don't know the volume of the flasks that are available.

Ms. Gallagher: I can tell you. We have a 250 mL flask. We have a 500 mL flask.

Craig: Do we have any ones that are smaller than 125?

Ms. Gallagher: I do, but whether or not I have a stopper that is large enough to have the glass go through it and fit the tube…so we'll work on it. Okay, so right now you know that you've got those four. 125, 250, 300, and 500. Now I should let you know that all of the mouths of the flask are not the same diameter. So make sure you test your stopper first before doing the experiment and then putting your stopper in there and then realizing oh my god it fell in. Okay?

Kelly: Wait. Ms. Gallagher?

Ms. Gallagher: One sec.

Adam: We should do 250 a couple of times.

Ms. Gallagher: As soon as you guys have a data table, get back here and start collecting your data.

[22:09]

Kim: For the control do we need exact numbers?

Ms. Gallagher: If you're going to graph it, you're going to need exact numbers.

Frank: Ms. Gallagher, can we test our variables?

Ms. Gallagher: Yes, go! Your controls. You have time for controls today.

[22:31]

Kelly: Ms. Gallagher.

Ms. Gallagher: Yeah.

Kelly: Are we not allowed to put acetic acid back into the container if we took too much in the small graduated cylinder?

Ms. Gallagher: If you're confident that that graduated cylinder is clean, then go ahead and pour it back in.

Kelly: If not, where should we dispose it?

Ms. Gallagher: In the sink.

Kelly: See? We can put it in the sink.

Mary: Well, last time you said…

Ms. Gallagher: That's right. That's a good thing. You should always ask. You should always ask 'cause that last stuff had to be put in the fume hood.

[23:00]

Craig: Ms. Gallagher, ours is about to overflow.

Ms. Gallagher: You'll have to get some paper towels.

Michelle: How do we measure it?

Ms. Gallagher: Well, you can't now because you lost some. So now you know that you're gonna want to get a 100 mL graduated cylinder. Okay?

Craig: That's awesome. How come this didn't happen the last time?

Adam: 'Cause we swirled it.

Michelle: No, 'cause last time…

Craig: No, I'm talking about like last, the first time.

Michelle: We didn't swirl it.

CHEMCO-3

[00:00]

Ms. Gallagher: Today you want to make sure that you get enough data testing your variables so that you consider yourself an expert about your variables. Because next class, first thing, you're going to present your information to the rest of us. The required visual aids, once again, are a graph that analyzes your data and your interpretive drawing, the particulate drawings that analyzes your data. Everything else that you choose to do would be helpful, so if you have more slides than those two, of course that's fine. Plus it'll cut down on the work you have to do for your lab report. So don't lose that information, okay? But that's first thing. So today, hopefully, you can get through collecting your data and then spending time in your group talking about which slides are we going to do, what's going to be on them, what order, and who's going to say what when? So you want to communicate that information before you leave. If not, if you run out of time, make sure you have a way to communicate to one another outside of class time. And then when do you need to email me your information, if you're choosing to do a digital visual aid.

Jack: Wednesday night before 12 o'clock.

Ms. Gallagher: Yes.

Craig: It shouldn't be a problem, but what if we run out of time with the testing?

Ms. Gallagher: You mean you still want to gather more data?

Craig: Yes.

Ms. Gallagher: Then you have to talk to me about who has free blocks or when you can come in; tomorrow morning is fine. So you can talk to me if you do. The last class, hopefully, at least it appeared that everyone finished—I don't know if they did, but it appeared that they finished. Questions for me?

Dan: Do you have a cold?

Ms. Gallagher: I have a cold. Well, whatever it is.

Jack: Hopefully with the right testing, we'll find a cure for your cold.

Ms. Gallagher: That would be great.

Dan: We really should.

Ms. Gallagher: That would be wonderful.

Dan: That would be on film, right?

Tom: The review's this Thursday or next Thursday?

Ms. Gallagher: The review is this Thursday. This Thursday for the packet. So your packet is due Monday. That's two classes from now. Your packet is due Monday. If you have questions and you can't come to the review session on Thursday morning, then email them to me or come in on your own time before school or something and I will help you. Yes?

Jack: When's the first test?

Ms. Gallagher: Next Friday. It's a big one. Yes?

Nick: What's that review?

Ms. Gallagher: Review for the packet…if you have questions about the packet. You can come in then and ask.

Robert: For the test, the review is…

Ms. Gallagher: It's this Thursday. The class period before your packet is due. Other questions for me? Okay, you guys can get started.

[03:10]

Dan: We need vegetable oil. The ethanol cabinet she said is broken. We should use the Coke.

Tara: Yeah.

Dan: So…

Tara: 200 mL.

Jack: Hey, you guys.

Dan: Are we going to have enough for three?

Tara: Oh, yeah!

Jack: I'm taking initiative. You're in charge of finding out the dangers of this and ethanol.

Nick: Yes, sir.

Jack: Great.

Tara: Wait, guys, guys. Guys! We're not going to have enough.

Jack: Huh?

Tara: We're not going to have enough for three trials.

Dan: 591 mL bottle.

Tara: So we'll need another one. Who wants to get another bottle? Guys, seriously, I don't have any money.

Jack: I don't have singles.

Tara: Go to the bookstore. You should buy a box of ___.

Karen: It's just a dollar, right?

Tara: What? Yeah.

Karen: What kind is it?

Dan: She's steppin' up.

Jack: Yeah.

[04:05]

Tara: So is it ethyl alcohol?

Jack: I think.

Tara: There is no ethanol. Which one is it? There's like 50 of them.

Nick: What's oil?

Dan: Did you check canola?

Nick: There is none.

Dan: There's nothing under oil either? Oils…

Nick: This one?

Dan: Try vegetable oil.

Nick: Nothing.

Dan: You sure?

Nick: Yep.

Tara: There's no vegetable oil.

Dan: Not anywhere in the entire world or…?

Tara: Look it up...is there like an index in the back? Yeah, there's an index. Look it up. Like oil or I don't know something.

<Ms. Gallagher approaches group.>

Tara: There's like 50 yeah.

Ms. Gallagher: Okay. Once you get the bottle, you would see which type it is. I think that it's the 95%, but you want to check. Anhydrous, 95%, or 70%.

Tara: And there's like this one too.

Ms. Gallagher: But the isopropyl alcohol, no. You see how these are different? They're listed differently. So you would look at the bottle and see.

Nick: Do you know what this is?

Ms. Gallagher: Vegetable oil?

Nick: There is no vegetable oil.

Tara: Wait, so it could be this one?

Ms. Gallagher: You'll have to look online.

Tara: So it could be this one?

Ms. Gallagher: But you won't know until the bottle comes out of the locked cabinet.

Tara: Is there Coke in here?

[05:31]

Ms. Gallagher: Okay, here's your ethanol. How's it listed?

Tara: Uh, this one.

Ms. Gallagher: Anhydrous.

Tara: Yeah.

Tara: So just…we don't write anything?

Ms. Gallagher: Well, we know that it's flammable because it's an alcohol, right?

Tara: Oh, so does this one work for all of these?

Ms. Gallagher: Yeah. And then they added this one.

Tara: Ohhhhh. Okay, so.

Ms. Gallagher: Wait, let me see this one second. Oh, that's ethanol. It's the same.

Tara: Oh, wait, there's an ethanol. Oh, it just says, "See ethyl alcohol."

Ms. Gallagher: Okay, so, how much volume do you guys need?

Tara: Um, are we going to have like the same amount as…?

Nick: We need 600 mL.

Ms. Gallagher: 600 mils? Oh, for three trials.

Tara: Yeah.

Ms. Gallagher: Is this for the middle flask?

Tara: Yeah.

Ms. Gallagher: You don't need to redo it. You just…whatever you don't use you put back into the middle.

Tara: Oh, just once? Then we don't need another Coke! Wait, so we only have to do each one for the middle one only once?

Dan: No we have to do it three times, but whatever goes into the graduated cylinder, you can pour right back in into the middle flask.

Ms. Gallagher: So if you guys need more than this, let me know, okay?

[06:53]

Tara: Okay, let's write down the hazards of ethanol.

Nick: Do we have to?

Tara: Yeah. 'Cause there's safety hazards.

Dan: Where do you think we should write it?

Tara: Um, dangerous fire risk, so it's flammable. Poisonous. That's it.

Dan: What is it?

Tara: It says dangerous fire risk, flammable, addition of denaturant makes the product poisonous. So it's flammable and poisonous. Fire risk can be the same as flammable, right?

[07:41]

Dan: This is scientific Coke. Handle it with care.

Tara: Keep it PG.

Nick: Wait, what's the safety?

Tara: What? It's flammable and poisonous. Ethanol is flammable and poisonous. And we have to write what we're gonna do if one of us swallows it.

Nick: You don't swallow it.

Tara: It's poisonous!

Dan: Alert a teacher.

Tara: Alert a teacher. Is that it?

Dan: Yeah.

Tara: Okay. So since we don't know the vegetable oil or the Coke…

Dan: Let's just start with the ethanol test, shouldn't we?

Tara: The ethanol, 'cause we already know about the ethanol. This is the ethanol.

Nick: Can I see the note?

Tara: Yeah.

Dan: Careful. You aren't being careful.

Tara: Why am I not?

Dan: Because I said you aren't.

[08:38]

Dan: No wait, he's getting a dropper.

Tara: It doesn't matter.

Dan: What do you mean it doesn't matter?

Tara: I mean it doesn't matter.

Dan: It does. You can't do it good.

Tara: Well.

Dan: You screwed up. We got the dropper.

Tara: And I got 5 mL.

Dan: Did you?

Tara: Yeah. That is five, right?

Nick: Let me see it.

Tara: Oh my God.

Nick: Oh, wait, wait!

Tara: Oh, yeah, the shakes, the shakes. Oh my god.

Dan: Is it still going?

Tara: Yeah. That's a lot! We have to have a conclusion about this, like why certain things work out the most.

Dan: Okay, okay, let's do the experiment before we…

Tara: Okay, so how much is it?

Nick: 40.7

Tara: Just .7?

Nick: .78.

Dan: Well, if it's .78 then it should be .8. 40.8

Nick: Okay, 40.

Tara: .8.

Dan: Milliliters? Woah, woah, woah.

Nick: Wait.

Dan: It just started again!

Tara: What?

Karen: I didn't do anything.

Nick: It's going up.

Tara: Wait, it's going up?

Nick: Yeah to 42.9.

Tara: 42.9.

Nick: It's going up.

Tara: Stop it!

Nick: I'm not kidding. It's 43 then.

Tara: 43.0?

Nick: Yeah.

Tara: I literally crossed this thing out like 50 times.

[10:46]

Ms. Gallagher: Have you guys done any tests?

Jack: Yeah, ethanol twice.

Ms. Gallagher: And?

Tara: It's been a lot higher than the one.

Jack: Let's see if shakin' the shake…

<Dan adds baking soda into flask that Karen is holding.>

Nick: Redo.

Dan: What happened?

Nick: It's not holding.

Tara: Now, it's working.

Dan: Give it another shake.

Nick: So let's just put 44.

Dan: We're on film. We're on film.

Jack: Oh, let's take some cans of spray paint.

Dan: Oh, I got 44.

Jack: 44.1

Nick: Yeah.

Jack: Dump it. Dump it!

Karen: What?

<laughter>

Tara: That's naughty.

Jack: I'm gonna go get a calculator.

<laughter>

Tara: Okay, now we're doing the Coke, right?

Dan: Yeah, vegetable oil is left.

Karen: What do we do with the ethanol? Do it down the drain?

Tara: Wash it and yeah down the drain. Alcohol.

[12:10]

Jack: It's 44. The average is 44.

Tara: Really? Point zero?

Jack: Yep. Don't forget about the point zeros.

Nick: What was the average for water?

Tara and Jack: 35.3.

Tara: Are you guys ready? We should probably wait until all the gas comes out.

Jack: Um, do we have the powder?

Dan: No, give me the dishes.

[12:41]

Dan: Hold on, let me do my powder thing.

Tara: Nice. Ready?

Dan: No.

Jack: Estamos listos?

Dan: How is possible that you keep bumping me?

<laughter>

Dan: No. No, no. Unplug it. We're going to have to redo it.

Jack: This is ridiculous.

Tara: I'm sorry.

Dan: Stop bumping me.

Tara: Twice.

Dan: It's very delicate to pour the powder in so you cannot bump me.

[13:21]

Dan: Are you ready to go?

Tara: Yeah. Okay. Ready?

Dan: Ready to go.

Tara: Set. Go.

Dan: Begin. Oh, wow. Oh, wow. Oh, man, here it comes.

Tara: Actually it looks like the gas bubbles are like stopping it. Right there.

Dan: Oh. Woah, relax, let it do its thing. It's still going. It's still going. Let it go.

Nick: Aah, I want to drink this.

Tara: Ew. That is disgusting. Why is it so much? It just keeps going and going and going. If it goes over 50, we'll just pour it into a bigger one.

Karen: Yeah, but it's not stopping.

Nick: Do it later.

Tara: Yeah, no, no, no. Not now.

Dan: Do we have to wait for it to go back down the straw? I'm gonna leave.

Tara: It's still going up.

Karen: This is crazy.

Nick: Shouldn't we just start at the 200…I mean 100?

Tara: Yeah, that's a good idea.

Dan: That Coke is still going…

Jack: It's still going?

Dan: …slowly. So should we wait until it goes back down the straw the other way?

Ms. G.: That's your call.

Dan: It's our call, guys.

Jack: Could we switch it really quick? Get another…

Dan: No we got it. It's right there.

Nick: Is it possible to do this?

Tara: Yeah, just lean it against the edge. Lean it…line them up and just transfer it along the edge.

Jack: I know what to do. I got this.

Tara: Yeah, like that. Yeah.

Nick: Can we pour it in?

Tara: No, don't pour it in until…

Dan: Why?

Tara: Put it like that.

Dan: Why not pour it in?

Tara: Because you only _____.

Nick: Do you want to drink this?

Dan: No.

Jack: No.

Dan: I have no desire to put that in my mouth.

Tara: It's still going!

Jack: Alright, it's time to stop it honestly.

Tara: It's just two more times.

Dan: Honestly, this is gonna go for at least 12 more hours.

Jack: Alright, stop. Stop. This is just getting ridiculous now.

Dan: This is becoming a safety hazard.

Jack: Hey, could some of us start working on like the graphs and all that stuff?

Tara: Graphs?

Jack: I mean for the PowerPoint.

Dan: How we gonna graph when we don't have the data yet?

Jack: We have the data for the first two.

Tara: Oh, wow, good job.

Dan: Ow. We've got a little attitude.

Jack: Actually, I'm just trying to help the group here. Doesn't it make sense if we get started 'cause we're obviously not going to have enough time for this.

Tara: Are you _____?

Dan: No, that's your job.

Jack: No. No. I don't understand. You're not following me. Some of us are working on the lab here, but we have information for these two. So we could just start typing up some of the stuff. And since you know what you're doing, I figured we could just both go do it. And then could you three handle it? Is it a good idea? I mean if we don't…if we all just want to sit here…I mean to get through it.

Tara: We're not really accomplishing anything while the Coke is still going.

Jack: So you three could finish this off and we can go and get this done. Good idea or bad idea? Good? Alright, let's go.

Tara: Are we allowed to go?

Jack: I'm sure we are. We're allowed to do whatever we want just as long as we get it done.

Dan: In real science, I don't think that they work in 90-minute blocks.

Jack: Um, can three of us go start working on the PowerPoint if we have some of the information?

Ms. Gallagher: You don't need three to do a PowerPoint.

Dan: No. Two of us are gonna go. Three are gonna stay.

Ms. Gallagher: That's up to your group.

Dan: We're just clearing it with you.

Jack: Alright, we're going then. Alright?

Dan: Guys, you're probably gonna end up needing this <points to a 1000 mL graduated cylinder> due to the fact that it will go forever.

[18:33]

Tara: We can see that if it's like 5 drops every 30 seconds then we can stop it. Counting 30 seconds. Wait. Go.

Nick: One. Two.

Tara: Oh.

Nick: It's going up but…

Tara: It's just the drop by something.

Nick: We should just stop it. Yeah.

Karen: Yeah.

Nick: Open it.

<Nick begins transferring Coke from small graduated cylinder into the 100 mL graduated cylinder.>

Tara: Geez.

Karen: Wow.

Tara: Oh, no, it's not over a 100.

Nick: 97 point.

Tara: What seven?

Nick: Point eight.

Tara: 97? 97.8

[20:19]

Nick: We're on the second trial.

Dan: What?

Nick: We're in the 50s.

Dan: What? What was the first trial of Coke?

Nick: 97.8.

Dan: Like are we getting closer or no?

Tara: Okay, yeah, cause it's a half a minute, so we're done. You know what? I think it's 'cause there's no cloud of gas.

Nick: Carbon dioxide.

Tara: Yeah, there's carbon dioxide. So that makes sense. So maybe.

Dan: Put it back in.

Tara: No. We're done. We're done. We're done. Guys, we're done. How much is it?

Karen: Uh, how much is it?

Nick: Sixty….What is it? 64.5. It's just so like low. <Nick implies that they should change the number.>

Tara: No, no, no. Leave it. Because the reason is because it's lost carbon dioxide out of it so next time it will be even smaller. That makes sense. It makes sense. So we actually have something to write about. So did you guys like get anywhere?

[21:34]

Tara: That was fairly slow, guys.

Karen: That was better than when you screwed it up.

Tara: I'm just kidding.

Dan: Now there's a lot less bubbles. Lot less carbonation.

Tara: Now we have to go until it goes to 5 drops in 30 seconds.

Dan: Wait, are you writing all this down how you are doing it? You should do that if you have some like rockin' system that you're not going to tell me about.

Ms. Gallagher: You guys still have 40 minutes left to finish collecting your data and then talk about your presentation. Budget your time.

Dan: Tara, do you want graphs of…

Tara: I don't know what do we need?

Dan: Like what kind of graphs do we want to be making?

Tara: I think that we should be making them of this.

Nick: 36.2.

Tara: Because we could like change the graphs and make like, um, a…

Dan: You can make a graph in the PowerPoint program though. You don't have to go to Excel, do you?

Ms. Gallagher: I've always imported it from Excel.

Dan: Okay, you're saying it's just easier if you import it?

Ms. Gallagher: It has been for me. I don't know. Maybe somebody else knows a shortcut.

Tara: Wait. How much was it?

Nick: 36.2.

Tara: Is that okay that it's all been going down because I think it's because it's less carbonation.

Ms. Gallagher: You guys need to talk that through.

Tara: Well, would that make sense?

Dan: It does to me if you were wondering.

Nick: We shouldn't have done this Coke thing.

Ms. Gallagher: You shouldn't have done it. Is that what you said?

Tara: No, because it shows us that something more carbonated works better.

Kelly: May I go and use the restroom?

Ms. Gallagher: Yeah. So what liquids have you done so far?

Dan: Water, ethanol, and Coke. All we have to do is this.

Tara: The average is 66.2. And now we do vegetable oil.

[24:05]

Ms. Gallagher: Okay, give me what's "it."

Frank: I mean. Alright.

Ms. Gallagher: So tell me what it is you found.

Frank: The more…the higher the volume of acetic acid, it burns off the baking soda too fast like if you get to the ___ so that there's not enough gas produced to push more water compared to the control.

Ms. Gallagher: So that's the pattern you saw. The greater the volume, the lower the volume of water collected.

Frank: You could actually use this to make a choice or whatever where it's like the optimal amount of acetic acid. Once you get beyond that, then you'll just be like burning through too much baking soda too fast.

Ms. Gallagher: So do you think you have the optimal condition figured out?

Frank: Well, we can start to see like…You can start to see that it could be like 7.25.

Ms. Gallagher: Will that show up anywhere?

Frank: What do you mean?

Sandy: We could make a graph.

Ms. Gallagher: Oh, good idea.

Sandy: Yay, we'll make a graph.

Ms. Gallagher: So go see what happens when you draw your picture and talk it through with each other.

Frank: We can go to the lab?

Ms. Gallagher: Which lab? Try the science computer lab.

Frank: Do we have to wear our goggles?

Ms. Gallagher: To the computer lab? No.

[25:35]

Tara: 44?

Nick: 24.

Tara: 24.0?

Nick: Yeah.

Tara: And we do it again.

[25:55]

Tara: Okay, so what was it? There's the second drop. What?

Nick: 23 point.

Tara: 23? That's the same thing we had last!

Nick: Okay, we got 24.0.

Dan: Read it.

Nick: Five.

Tara and Karen: Five?

Nick: Does it count though?

Tara: Yeah. Why wouldn't it?

Karen: We have like no explanation for it.

Dan: Yeah, I mean, we don't need to have an explanation. We did it right and that's what happened.

Tara: But we have to figure out why it happens.

[26:38]

Dan: Make sure that oil lid's in there.

Tara: Oh, maybe that's why it didn't work.

Dan: Yeah, that's why it didn't work.

Tara: Okay, ready?

Dan: I'll hold it. Let's go.

Tara: Oily?

Dan: Let's go.

Tara: I wonder why it's oily?

Nick: Yeah, that's more like it.

Tara: Woah! Okay, I think that we should redo the second trial because I think it's just 'cause that wasn't down far enough. You, guys, this is so weird. I don't like this oil stuff.

Karen: It's just cooking oil.

Dan: What are we at?

Nick: 38.

[27:52]

Tara: What was the trial 3 and the average?

Dan: Average is 67.9.

Tara: Woah, what?

Dan: Oh, I forgot to divide it. 22.6.

Tara: So why did you only add two things here?

Dan: 24, 5, and 38.9.

Tara: Ooooh.

Dan: Okay, I'm gonna go back to the computer lab.

Tara: Maybe we should all go.

Nick: We'll go after.

Tara: No, I didn't mean like that. I meant all of us go. So does this get thrown away?

[28:39]

Tara: So are we going? Let's go.

CHEMCO-4A

[00:00]

Ms. Gallagher: Okay, first of all two things before we start the presentations. Number one, while you're listening to other groups present, here's what you need to make sure you record and understand. While you're listening to other groups present, here's the stuff you need to make sure you record and understand. Number one, their variable. What did they test? Number two, what did they conclude? Number three, does it make sense? Do you understand their reasoning behind the conclusion? If not, what should you be doing?

Kim: Asking questions.

Ms. Gallagher: Asking questions. Excellent. So while you're sitting there, yeah, you need to focus, you want to listen, get their variable down, get the information about the conclusion down, and make sure you can think it through at the particulate level, does this conclusion make sense based on the data presented? If not, you should be asking questions. Remember, you guys are sharing information with one another, in order to benefit, in order to get it so the whole class understands this lab really well. So you're not supposed to be putting each other on the spot, you're supposed to actually be trying to make it all make sense for one another. The second thing, while you're presenting—how much time do you have?

Students: Five minutes.

Ms. Gallagher: Five minutes or less, okay? In the back—I'll be sitting at this first lab table here to my left, and while you're presenting, if you get three minutes in, I'll hold up a whiteboard that says "Two minutes left," so you can tell. And then if you keep going, I'll hold up, "One minute left." And then at five minutes, I'll say, "Thank you. Does anyone have questions?" So I'll stop you at the five-minute mark, okay? Because we need to make sure we get through all six presentations today. So try to get to your information. Don't race, but use a good pace. We want to know what you're saying, and get all the good information in the five minutes, okay? And then I'll kind of guide how much time we have for questions. So the very last thing should be, "Does anyone have questions?" and then you can ask. Don't interrupt the presenters. Wait for them to finish. Questions for me before we begin?

Dan: So you want us to make sure to get down the variable and conclusion?

Ms. Gallagher: And?

Jack: Does it make sense.

Ms. Gallagher: Uh-hum. Does it make sense. If I were to ask you to draw me interpretative pictures of someone else's variable findings, could you do it?

Dan: Okay.

Ms. Gallagher: All right, take one minute, talk to your group, finish up any last minute stuff.

<overlapping conversations>

[03:28]

Ms. Gallagher: Okay, don't….give me a second before you start.

[03:40]

Ms. Gallagher: Okay, whenever you're ready.

Maria: Okay, this is our presentation, Chemistry Concoctions by Maria, Robert, Kelly, and Mary. And our variable was, or our question, does the mass of sodium bicarbonate affect the amount of water displaced?

Kelly: Okay, this is our table for the control data. Obviously, these are all the same. Our control was 0.2 grams of sodium bicarbonate. And the volume of water displaced…26.5, 28, 28.5 was the three trials that we did. And each time we also added the amount of water that was left in the 250 mL Erlenmeyer flask. And those weren't as accurate, because the—what do you call it? They only had…they didn't have like miniscule scales, like the graduated cylinder, so it wasn't exact, but we estimated. And then here we have the average.

<Maria advances the screen too many times. Mary adeptly moves it back>

Kim: Yeah, Mary.

Dan: Wow!

<laughter>

Kelly: So our first variable was 0.1.

[05:13]

Kelly: And 0.6. And here is the bar graph of what happened. 0.1 obviously there was nothing. And 0.2, our control, all of those had a steady amount. And then when we went to—oh this is supposed to say 0.4 and 0.6, but at 0.4, it doubled the amount that was displaced with 0.2 grams of sodium bicarbonate. But then when we got to 0.6 there wasn't like a big difference from 0.4 grams to 0.6 grams. And we're actually not sure why.

Robert: Well, because there wasn't enough acetic acid to react with all the bicarbonate. So not all the bicarbonate turned into gas with the reaction.

Kelly: Thank you.

[06:15]

Mary: So our analysis was that the more sodium bicarbonate, then more gas is produced in the second flask, and 'cause it caused pressure in the second one, and pushed the water through the tube into the graduated cylinder. And that was our chemical equation. And now our observations.

[06:39]

Mary: The test before all looked the same, except the thing we were changing this time was how much sodium bicarbonate that was in the first flask. So after .1 grams, we had 0 mL for all three trials. And then for .4, we had approximately 69 mL of water. Our tests for .6 we had approximately 112 mL.

Maria: And so this is our interpretive picture.

[07:17]

Mary: So our main conclusion is that the more reaction equals more gas equals more water displaced. And that .10 grams wasn't enough to cause the displacement. And .6 actually had left over sodium bicarbonate.

Ms. Gallagher: Okay, I'm gonna stop you there. Does anyone have questions?

<laughter>

Jack: Um…

<laughter>

Mary: Oh, I thought you were asking something.

Kim: You were talking about how when you added too much there wasn't a reaction, or what did you mean by that?

Robert: Well, there was a reaction, but the sodium bicarbonate, there wasn't enough acetic acid to react with all the sodium bicarbonate, and so once all the acetic acid reacted with part of the sodium bicarbonate, but the stuff that was left was still remaining in its original form.

Angie: Is there any way that you can go back to your last slide?

Kelly: Yeah, Mary taught me.

Ms. Gallagher: So the conclusion said that the greater the mass of the sodium bicarbonate the greater the volume of water displaced. But the explanation you just gave doesn't match that conclusion.

Robert: It's hard to explain like in one sentence.

Mary: It will end up leveling out after a while.

Robert: Like from a certain amount to a certain amount, it grows, but like once you exceed the maximum amount, it doesn't grow anymore and if you go less than the minimum amount, it can't be any less.

Ms. Gallagher: So do you guys have perhaps the optimum number to get the greatest volume of water, do you know what mass you would use?

Robert: It's at most .6 and the minimum is at least .1.

Ms. Gallagher: So did you do any masses of sodium bicarbonate greater than .6?

Kelly and Robert: No.

Ms. Gallagher: So you didn't like throw 10 g in there?

Robert: No.

Ms. Gallagher: Okay. Other questions for this group?

Angie: Did you say that it did react with the .6?

Robert: It reacted with some of…it might of like…I'm just guessing, it maybe reacted with .5 grams of the sodium bicarbonate, and the .1 gram left was…didn't react.

Angie: So did it react better when it was .4 because the ratio between the two was...

Mary: No, it reacted like even more of it, but because there was just like too much sodium bicarbonate for all the acetic acid to react with.

Kelly: So I think there's a certain ratio you need to keep to make the reaction work.

Angie: So when is there too much sodium bicarbonate?

Kelly: Like we said .6, we had leftover sodium bicarbonate in the flask.

Angie: Oh, okay.

Kelly: All the acetic acid was used up. It was all used up with the base.

Angie: Okay.

Dan: So is it like about .4, .5?

Robert: It's between .4 and .6.

Dan: Between .4 and .6, that's the optimum number? But like would you want to include .6 'cause then you're like wasting it and so much of it isn't reacted?

Kelly: Well, there is still a growth when we did from .4 and .6. There was still a growth. It just wasn't as significant as from .2 to .4.

Dan: Is that why from 2 to 4, it doubled, you said?

Kelly: Yeah, it doubled. The water displaced. But there was a growth between .4 and .6, but it just wasn't as big as, you know, .2 to .4.

Ms. Gallagher: Okay, I'm gonna stop…actually one more hand. Who's over there?

Frank: Did you find the amounts of water to be proportional like to the reactants?

Mary: I think there was one time where it was. Yeah, like with the second test. But that's because actually, different than the rest of you guys, we actually had a large graduated cylinder, so our tube actually had to go up, so there was some water still collecting in the tube.

Ms. Gallagher: Okay, nice job. You should clap.

<applause>

Ms. Gallagher: Um, who's next?

<Next group gets setup.>

[12:09]

Ms. Gallagher: Yeah, get to the key word, escape, and find your presentation. Do you have a hard copy for me? Guys?

Kelly: Huh?

Ms. Gallagher: Do you have a hard copy for me?

Jack: Yeah. Could we use? Oh do you need to look at it?

Ms. Gallagher: Do you have an extra?

Jack: Do we have an extra hard copy?

Tara: No.

Jack: Just one.

Ms. Gallagher: Okay, just give it to me when you're done.

Dan: Nah, it's fine you can have it.

Ms. Gallagher: Okay. <laughter> Thank you. Okay, whenever you're ready.

Dan: This is our Chemistry Concoctions, Inc. And our variable that we tested was how the different types of liquid in the middle flask affected how much water was displaced. And this is by Karen, Nick, Jack, Dan, and Tara.

Tara: The safety hazards for the acetic acid is that it's corrosive to skin tissue.

[13:23]

Dan: The initial trial…we got a ton of Coke. We actually had to switch graduated cylinders because it was getting so much, and we were just shy of a 100 mL of Coke. 97.8. And then as it went down…it went 64.5 to 36.2, and the reason we felt that the Coke, the numbers were going down is because the gas byproduct created by the sodium bicarbonate and the acetic acid with the gas from the Coke, made it more. And as we went on, we lost the gas in the Coke. It went to the air. And then lastly we did the oil and got…that it was the most viscous liquid…the thickest…we ended up with the smallest amount of liquid displaced.

<laughter>

Jack: Um, basically this is just our table. So this is just another visual aid. As you can see, Coke had a much greater milliliters…high volume than the other ones.

Karen: Our interpretation was that the viscosity of the liquid had something to do with the amount of liquid displaced.

[14:46]

Jack: Um, just to kind of reiterate the point. The viscosity or the thickness of the variable of the liquid in the middle flask, basically, that kind of influenced the amount of water displaced.

Ms. Gallagher: And I'm gonna stop you there. Does anyone have questions for this group?

Kelly: Could you explain why the Coke's displacement went down? I really didn't understand that part.

Dan: Yeah, what happened was what we did was, 'cause cause we weren't using the water so that we kept getting out of the same…the substance that would go from the middle flask to the graduated cylinder, we would just pour back in for each trial. And so as the trials went on, the…initially there were a lot of carbon dioxide bubbles in the Coke. And then as the trials went on then more and more would escape. So the bubbles from the Coke react with the bubbles from the chemical reaction and forced more out, but the less bubbles there were to work with the bubbles from the chemical reaction, the less got displaced into the graduated cylinder. See what I'm saying?

Kelly: Yeah.

Jack: Double bubbles.

Dan: Double bubbles. That's what we call it.

Kelly: Do they combine with the carbon dioxide?

Dan: No they didn't combine. There's more bubbles hence more displacement.

Nick: Same evaporation though.

Kelly: Ooooh. I see.

Jack: Hmmph? Hmmph?

Ms. Gallagher: Okay, what does *viscosity* mean?

Jack: Thickness.

Angie: I was going to ask that.

Ms. Gallagher: Oh, I'm sorry. I stole your question.

Angie: No, no. I didn't have my hand up. I was too afraid to ask because I thought it was a stupid question.

Ms. Gallagher: Oh no. You can't do that.

Jack: It's not stupid. It's not stupid.

Ms. Gallagher: Oh no. You can't do that.

Dan, Jack and Ms. Gallagher: Ask.

Angie: What's viscosity?

Jack: Viscosity is the thickness of the liquid.

<laughter>

Jack: I explained that just…viscosity or thickness.

Angie: I'm sorry.

Ms. Gallagher: Why might that affect how much liquid is being pushed out?

Jack: Because the chemical reaction, if it's something like vegetable oil, it's a lot thicker so it would be harder to move or displace because the chemical reaction doesn't push hard enough.

Ms. Gallagher: Okay, what does the "thicker-ness" mean? I don't understand what like why would one liquid be thicker than the other?

Dan: Why would it be thicker than the other? Because that's how it is. It's not that part of our control of how thick the liquid came. It's just what was given to us.

Ms. Gallagher: Particulate level. Can you think of any reason why one liquid might be thicker than another?

Dan: Yeah. It's because the particles say in a oil are probably closer together and more like a solid than maybe the particles of ethanol, water, or Coke, which are more spread out and have less of a definite shape.

Jack: More space between the particles.

Ms. Gallagher: Okay. Other questions for this group? Nice job. <applause> Who's next? You guys are up.

[17:50]

Mark: Our variable we tested was volume of acetic acid and the effect on the amount of water displaced in the graduated cylinder. Um, our control was…

[18:01]

Frank: All right, this is our particulate drawing. As you can see the baking soda and the acetic acid. Before the reaction happened, the acetic acid was just sitting with water in there. Right when we mixed the chemicals we saw bubbling, and then after the reaction we found out that CO2 gas was produced. And CO2 gas came from this flask and pushed down the water into the graduated cylinder. Our chemical reaction was the sodium bicarbonate plus acetic acid equals CO2 plus H2O and sodium carbonate.

[18:50]

Kathy: When we tested 1 mL of acetic acid and when we put in the baking soda and then swirled it, there was a clump of baking soda in the bottom. So we got a lot less water in the graduated cylinder because there was less reaction. And then we tested 10 mL of acetic acid. And when we put in the baking soda, there were a lot of bubbles formed, so the reaction happened a lot more quickly. And we got more water than we did when we tested 1 mL, but we got less than we got when we tested our control. And then we tested 20 mL of acetic acid and again, the reaction happened really fast and there were a lot of bubbles. And we still got less than our control, but we got more than the others.

[20:08]

Sandy: And we made a graph and we found that the maximum point was at 6 mL, so that meant that to get the most amount of water displaced we had to have 6 mL of acetic acid. And in conclusion…any amount…to produce the most amount of water in the graduated cylinder, you have to have about six milliliters of acetic acid. And anything less than that will produce less…will have less water displaced into the graduated cylinder because there's not enough to react with all the sodium bicarbonate and anything more will produce less because the reaction happens too quickly, so not enough gas is produced.

Ms. Gallagher: Okay, I'm gonna stop you there. Any questions for this group?

Jack: What happens at the end? Is there just too much acetic acid?

Frank: It burns off the sodium bicarbonate too fast, so there isn't enough gas produced.

Lynn: So ever did it produce nothing in the graduated cylinder?

Mark: No, it did, but not as much.

Sandy: Not as much.

Frank: Yeah.

Angie: Wait, did you guys actually test 6 mL of acetic acid?

Frank: No, when we made our graph, it was the highest point.

Jack: What was the maximum? Six?

Frank: Yeah.

Ms. Gallagher: Any other questions? Okay.

<applause>

Ms. Gallagher: That was a weak clap. I'm sure you can give better applause. Okay, you guys had your hands up first up front. You guys are next.

<greater applause>

[22:25]

Ms. Gallagher: Okay, whenever you guys are ready. Go ahead.

Michelle: Okay, we did how the size of the Erlenmeyer flask affected the amount of water displaced. These are just the different sizes that we tested: 500, 250, 125, and 25. We went above and below the control so that we could see both sides.

[22:51]

Craig: And then this is our data table. The averages are all within one milliliter for each different flask. So we kind of saw that it didn't have much of an effect.

Adam: This is the graph for the data table, and it clearly shows exactly what he said. Everything was pretty much the same range. There wasn't a major change by changing the volume of the flask.

[23:31]

Mark: Was it just the middle flask that you changed size?

Craig: No, we changed the flask that contained the chemicals. So the first flask.

Lynn: Just go back to the conclusion for a second.

Michelle: The conclusion is that nothing, it doesn't affect it. Any other questions?

Ms. Gallagher: Okay, nice job.

<applause>

Ms. Gallagher: Okay, do that again. Clap again.

<greater applause>

Ms. Gallagher: Okay, are there any groups left?

Student: That's it.

Ms. Gallagher: Alright. Keep your journals out; we're gonna talk for a minute, just let me finish this up real quick.

CHEMCO-4B

[00:00]

Ms. Gallagher: Listen up! Next bit here is some feedback for you. So I'm starting with a picture.

Kelly: What's with the kids?

Ms. Gallagher: What's with the kids? Isn't that a great picture?

Lynn: Are those your kids?

Ms. Gallagher: They are my kids almost 10 years ago.

Students: Wow.

Ms. Gallagher: But I love…that was our Christmas picture one year.

Dan: Is she was upset with how we did?

Ms. Gallagher: I was thinking that maybe sometimes you felt like this during the lab.

<overlapping conversation>

Frank: I felt like the kid on the right.

Lynn: I feel like her when I got all excited when I thought it actually worked.

Ms. Gallagher: She wouldn't stop crying and she was trying to scream.

Frank: That was me. I couldn't stop crying. I was so nervous. I can't read.

Ms. Gallagher: Okay, I'm going to go through a four-part feedback for you, but before I do, I want you to write down in your journal your thoughts with regards to these things. So it doesn't have to be full sentences. I want you to brainstorm, bullet point, just get this information down. What went well with this lab? And it can be anything. I'm talking about from the very beginning to just now. So individually in your group, the technique you used in lab, the content, your understanding of it. And also the mechanics. Meaning did you read the lab, did you prepare for lab, the presentation, PowerPoint, if you used that program, etcetera? What didn't go so well? What could you do as an individual to improve for the next project? So maybe there's something you're going to do differently in order to make the experience more beneficial. And then what could you do as a class to improve? Is there something you think you could do? Even in your small groups, or as a whole, a class, to do to make the experience better. So write down your thoughts and then we'll talk.

<students writing>

[02:14]

Ms. Gallagher: Okay, what'd you think? Some of you are still writing, and that's fine. I will get a chance to see what you've written when I collect your journals. But for right now, what will you share. What went well?

Jack: Our group had to separate the work at the end of our class period…separate the amount of work that we had to do.

Ms. Gallagher: Okay.

Jack: There wasn't a lot of…I mean there was a little bit of problems because they're like I really didn't want to do this…the biggest…usually when we separate work and have to bring it back together the following night, usually that just never works. Someone just doesn't follow through. Someone just emails that this doesn't work. But it actually worked and it came out…

Ms. Gallagher: That is great news 'cause cause you're right. Usually there's some sort of glitch…

Jack: It never works well.

Ms. Gallagher: …so that it doesn't come together. So keep that in mind because this is the first of dozens of these things that you're going to do this year.

Dan: Dozens?

Kelly: Oh, awesome.

<laughter>

Frank: Oh, yes!

Ms. Gallagher: So you want to keep that going…whatever made it happen.

Jack: We have a thousand batting average.

Dan: This is a solid group.

Ms. Gallagher: It's a solid group. It's a solid class.

[03:25]

Frank: Uh, I thought it was hard at the end, 'cause we like really pushed it out to the limit…and when we tried to email it at the end, the school site had your email wrong, so like that kinda went wrong, 'cause then we had to go to your website, and find your real email address. So that's why…

Ms. Gallagher: The school's website has my email address wrong?

Frank: Yeah, when you go to departments, and then like science, it says just "jgallagher." And it doesn't say _____.

Ms. Gallagher: @_____, so it cuts it off at Gallagher, and then it says @_____.

Frank: Yeah.

Ms. Gallagher: But you guys have my email address on the sheet in the front of your journal, right?

<laughter>

Student: I do. I got it.

Ms. Gallagher: Right?

Student: I do. I have it. Well, I didn't have it in my journal.

Ms. Gallagher: That is a problem, though. I'm gonna have to tell somebody about that.

Frank: It still is a problem though.

Sandy: Yeah, it still is a problem.

Ms. Gallagher: Yes, it still is a problem. Okay…did I…but I got your presentation. You showed it, right? Was is it like at 12:24?

Sandy: We figured it out like…I was like up until…

Ms. Gallagher: Was yours the group that said, "I'm trying this one more time then I'm going to bed."

Sandy: That was me.

Ms. Gallagher: Okay.

Mary: Oh, yeah, I did one like that too. Just in case.

Jack: Was it at 11:59?

Ms. Gallagher: Theirs was at like 12:24.

<overlapping conversation>

Angie: We had ours in by 11:30.

Jack: My clock was like ticking.

Mary: Ours was like 11:45 or something.

Ms. Gallagher: The latest one that was on time was 11:54.

Student: Wow.

Dan: Did you stay up until midnight?

Ms. Gallagher: I don't need to stay up, right?

Dan: Oh, you just check it this morning and check the time?

Mark: It says when it was sent.

Ms. Gallagher: But I was up.

Chris: Wait, so if you sent it like 12:01, that was late?

Ms. Gallagher: Yes.

Chris: Even with just 30 seconds over, it's not that late.

<overlapping conversation>

Ms. Gallagher: It's late. You said, "Is that late?" I said, "Yeah, that's late." You didn't say anything about counting anything.

Chris: Oh, I thought you meant you counted that as...

Ms. Gallagher: It's late.

Angie: Wait, are you talking about late as in time?

<overlapping conversation>

Frank: Listen to what she's saying.

Ms. Gallagher: Yes, as in time, it is late. That was the question.

Angie: It's kind of early.

Dan: You really should be more specific.

Frank: She answered the question.

Kelly: Did you take points off?

Ms. Gallagher: No, I said the deadline time. I don't talk about points. Yeah, go ahead.

Sandy: So does that mean that ours is going to get discounted?

Ms. Gallagher: I'm not talking about points. Okay, there's nothing on here that talks about points.

Lynn: Was ours at 10:45?

Ms. Gallagher: What?

Lynn: Was 10:45 when you got it?

Ms. Gallagher: I think so.

<overlapping conversation>

Ms. Gallagher: Back to the feedback.

Kelly: I liked…I liked how…like every time…our group when we did the experiment with the variables. Every time we did it we saw a different result and that was really cool. And while we were doing the experiment, I think that our group worked really well. We weren't like, "No, I'm gonna do this, I'm gonna do that."

Mary: We had assigned like jobs that would like be really efficient.

Kelly: Mary and I kinda jumped around with the sodium bicarbonate weighing thing.

Ms. Gallagher: Well, the efficiency part is important, because you guys had a lot of time for this lab. Whether you think you did or not, that was a lot of time in my mind. So you want to do what you guys did. Have jobs for people, try to move it, keep it going, so you can get as many data points as you possibly can.

Angie: I think our group was lucky, because all of our stuff was worked out. So instead of just dividing up the work, like we just met at one person's house and did the presentation there.

Ms. Gallagher: Oh, that's rare, that that works out. That's nice.

Kim: My group also worked really efficiently, like we didn't even have to assign people jobs. We kind of just fit in, like we were able 'cause we had temperatures. We like grabbed it, poured, and we just did it like really fast. We was very good.

Ms. Gallagher: Good.

Lynn: Though but also every group you could see their presentations, like they knew their variable, they knew what they were talking about. They stuck to their variable and didn't go on to some other variable.

Ms. Gallagher: Okay. So you shifted to a class mentality. That's great. Remember the idea was that you guys were supposed to communicate your group findings to the audience, so that everybody understands the lab really well. And you feel like everybody was pretty comfortable up here? Could you all hear?

Lynn: No, there were some people who were quiet.

Ms. Gallagher: Yeah, I mean, sometimes it was hard, but you still felt like they were comfortable. That's a bonus. That's a great sign at the beginning of the year, because you guys will be sharing a lot, okay? What else? Anything you think you maybe want to work on as a group?

Frank: I just think that as in general it might not just be our group, but putting the whole presentation out of school, like we needed to do that better. 'Cause ours just kind of seemed like it was sloppy to me.

Ms. Gallagher: Okay. Yeah, the practice part and getting the mechanics of the presentation together, that is hard. I mean, everybody usually has a very different schedule, and when you do find the time to put it together, sometimes you don't have the chance to edit it or go back and make it smooth. I will tell you, though, that the one thing you guys didn't have, that you typically do have at the beginning of the year, is computers at your lab table. So that you could actually work on it while you're doing the lab. And so that is supposed to happen by tomorrow. Those computers are supposed to be up and functioning. So that at least you could get a start on the outline of what your presentations are going to look like together, and then maybe breaking it up won't be so difficult to get it back together in the end. I agree.

Jack: As soon as you do a test, you can plug it in.

[09:10]

Ms. Gallagher: Okay, we gotta move on. I will read the rest of your responses at some point. I'm going to give you some feedback today. Four areas of feedback typically: Lab, like the mechanics of doing the lab, etcetera; Community, how you work together—part of this got cut off here; Content, in terms of understanding the chemistry behind the lab. Usually I put those two things together. I've broken it up because of the assembly last week. The schedule kind of worked this way. So I'm gonna share these two today. And then I'll go to these, Content and Presentation. Like how well you did today. Not talking about that today; I'll tell you that next

class. So first thing, look at the objectives on your lab sheet. In your journal, if you taped the lab in there, what does it say? How many objectives are there?

Students: Five.

Ms. Gallagher: How many have you done?

Students: Four. Four. Three. Four.

Frank: Five.

Students: Four. Three. Three. Three.

Kim: No, we have to write a formal lab report.

Angie: We already did the lab report.

Ms. Gallagher: I hear three. What's number four say?

Students: To apply knowledge gained from lab to a practical.

Ms. Gallagher: So you had a practical yet? No. Number four has not been done.

<overlapping conversation>

Ms. Gallagher: Kelly, say that louder.

Kelly: She's gonna go tell us what to do and we have to go make it happen. Like if she wants a lot of water displaced or less, then we have to go do it.

Ms. Gallagher: Okay, good, example. So I'm going to actually ask you to do something with this particular lab, go make it happen. Now that you've heard all of this information, you should all be experts at the lab and you should be able to make it happen like that.

Chris: So are we going to take a lot of acetic acid and just go?

Ms. Gallagher: You'll see. Whatever my description is.

Dan: Are we all doing the same reaction?

Ms. Gallagher: You'll see.

Kelly: She's so mysterious.

Ms. Gallagher: I am mysterious. Or annoying is another word. What's number five?

Angie: To write a quality, formal lab report.

Ms. Gallagher: And you notice that up here, quality is the key. I may have a chance to actually talk to this class about this. I'm not sure. I ran out of time in the other two classes. This isn't due until the day after your test. So you will have a chance to talk in your groups. If we don't get to talk about it today, first thing next class, you're gonna want to break up the work because it's one per group. Okay?

Tara: Oh, well, that's awesome!

<overlapping conversation>

Ms. Gallagher: Pretty good job with safety. For the future, you should all know this. If you hear me reminding you about some safety hazard going on in the back, that's bad. Because I will

notice someone without goggles and stare at that person, and time it for about two minutes. And if no one else has been kind enough to remind the person to put his or her goggles back on, then I say something. So you don't want that to happen. You don't want that amount of time to go by before you remind one another. Of course, if there's an immediate danger, I would say something, okay? I would not have you risking your sight, yeah. But I will wait for two minutes if there's not immediate danger. Usually if there's immediate danger, I blow my whistle and everybody.

Dan: You have a whistle?

Ms. Gallagher: A coach's whistle, yeah. And it's really loud in this room. If you think it's loud in a gym. In here it's really…

Angie: Wait, what do you coach?

Ms. Gallagher: I used to coach.

Frank: Wouldn't that put us more in danger, because it'd scare us and we like drop the beaker and it would like shatter?

Ms. Gallagher: Well, at that point, you know, what can I do? I need to have you freeze. Actually, in your mind, think to yourself, "Whistle, freeze!"

Jack: Whistle, freak out.

<laughter>

Ms. Gallagher: If I hear you reminding one another in terms of safety stuff, that's good. So don't be whispering it or thinking that you have to hide reminding one another that's supposed to be happening, okay? Now let's go through some pictures of the way you left the lab.

Dan: Oh man.

Kelly: Oh my god, it's clean though.

Dan: These are the before; wait for the after.

Ms. Gallagher: Yeah, what's wrong with that picture?

Frank: The lid's not on?

Ms. Gallagher: The lid's not on. Okay? So that chemical is now unusable.

Kelly: Is it just with our class?

Ms. Gallagher: By the end of this class, it was disastrous.

Kelly: Oh.

Ms. Gallagher: Yeah.

Angie: Did we improve from the last time though?

Ms. Gallagher: No. No.

Dan: Darn 2/3 kids <referring to previous class>. What's wrong with them?

Ms. Gallagher: Okay? What's wrong with this?

Frank: I cleaned it up after. I took the make up brush and cleaned it.

Ms. Gallagher: Yeah, so after the first class during this day, I did go get a make up brush and clean off the balances. So this was after 2/3. What's wrong with this picture?

Angie: It's not in…there's no cap.

Ms. Gallagher: Yeah, the cap is here. The bottle's here and there's stopper in there. Okay? So that's bad.

<shows another picture of dirty balances>

Kelly: Bad. Bad. Bad.

Jack: Ugh. I can't look at it anymore.

Ms. Gallagher: Over and over and over again. I'll go back. The chemicals on the balances cannot happen anymore. Okay? That will remove you from lab. If at the end of a lab, you guys have the balances left like that somehow you're gonna have to collect your data and talk about it without using the lab anymore. 'Cause these balances won't be functional if we keep spilling those chemicals on them and leaving them. So by the end of this class these were the three balances. Those are the three pictures. So, yeah, Frank had cleaned them off for us and then by the end they were messy again.

Frank: I messed that…that was my fault.

Ms. Gallagher: Oh.

Frank: So I cleaned it then I dirtied it up.

Ms. Gallagher: What's wrong with this student here?

Chris: He is not under the fume hood?

Jack: Yeah, he's not under the fume hood.

Ms. Gallagher: Well, yeah, the chemicals should be in the fume hood. That's a good catch.

Angie: Are his goggles on? I can't tell.

Ms. Gallagher: Yeah, his goggles are on.

Jack: You shouldn't trust him with any chemicals.

Ms. Gallagher: Well, that…I'll actually have to figure that out as the year progresses. Yeah?

Lynn: He's not on the table. He's like in the midair.

Ms. Gallagher: <laughs> Okay. Yeah, it kind of looks like he's in midair. He's like really tall to me. How is he positioned?

Frank: He's sitting down.

Ms. Gallagher: He's sitting down. That's really dangerous.

Students: Why?

Jack: 'Cause you could spill it on your lap.

Ms. Gallagher: Yeah, if a container of a chemical spills and you're sitting, you have no response time. You just have to wait for it. It's gonna hit you. Okay? It will be in your lap. That's not where you want the chemicals. Okay? If the container spills and you're standing, you have response time, you immediately get out of the way. Jump back, two steps to the side, or do something. So you're never supposed to sit in lab. Now I've removed all the stools from the back of the room purposefully. 'Cause it is really easy to forget and sit down, but that's dangerous. But he's the first student I've ever had think to move a desk to the fume hood and sit.

<laughter>

Ms. Gallagher: So I had to capture that picture because it's never happened to me before. So don't sit. Alright lab feedback. Unacceptable job with cleanup. You guys need to record this because it does matter. Okay? Everything about your labs and group work counts so you want to make sure you think about improving for next time. The thing is the individual lab tables were great and that seems to be a common thing. Four or five of you at a lab table and you think about your own lab table and you clean it up. It looks great. So these were a lot better than the last lab, but from there you move into the common areas. The middle lab table where everybody uses it. Okay? You need to think to yourself to go back and double-check it as a class 'cause it was left messy. And then the balances were even worse. Okay? So the common areas need your attention. You need to adopt a mentality of it matters for all of us so I'm gonna go check the common areas. Don't leave it for somebody else. Okay? That way it will be perfect. Alright. Community feedback. These might not pop up in order. I don't know if I had a chance to fix these or not, but a lot of times I'll give you feedback on how well you work together with the quotes. Do you remember last time I gave you a few quotes?

Kelly: Oh yeah.

Ms. Gallagher: Okay, so you guys tell me what you think of these. "One trial is enough. We can just make up the rest up from that."

Dan: Not okay.

Kelly: Oh.

<laughter>

Jack: Ew. Yuck.

Ms. Gallagher: "What happened? I'm not sure. What do you think was going on? Don't know. Don't care. Let's just guess."

Jack: Triple yuck.

Mary: The first two aren't that bad.

Ms. Gallagher: Yeah, the first two are good. Definitely. "Did you hear about Randy and Katy? No what? They broke up last night. No? What happened?

<laughter>

Ms. Gallagher: Of course I changed the names to protect the innocent or guilty or whatever you wanna…

Kelly: How can you hear us from like over here?

Ms. Gallagher: I have really big ears. I don't know. I have teacher hearing. This conversation isn't so bad in and of itself if it took 10 seconds, but it lasted 40 minutes.

Students: Woah.

Ms. Gallagher: I really could care less about Randy and Katy.

Mary: I wonder who they are?

Ms. Gallagher: Huh?

Mary: I wonder what their names are?

Ms. Gallagher: What their real names are? Yeah, they are different names because those are family members of mine. I just made those up. They were different names that were said. It's not Katy and Randy. "Four. Three. Two. One. Pour. Quick, get the stopper on."

Jack: Yeah, that's reasonable.

Ms. Gallagher: Yeah, that's great. Somebody was having a lot of fun with baking soda and vinegar. That was great.

Kelly: Did you say vinegar?

Lynn: Yeah, acetic acid is vinegar.

Kelly: Oh.

<overlapping conversation>

Ms. Gallagher: "Who here loves chemistry? I don't. I hate it."

Students: Aaaahhhhhh.

Jack: Wait, who asked the question?

Ms. Gallagher: Huh?

Jack: Who asked the question?

Ms. Gallagher: I don't…it was just some conversation.

<laughter>

Kelly: What a weird question! Oh, wait, I do! I do! <sarcastically>

Ms. Gallagher: That's even more hurtful!

<laughter>

Ms. Gallagher: Now I need to add that quote!

<more laughter>

Ms. Gallagher: Um, "I'm writing down 37.2 mL in my journal. I don't care what you guys write down in your journal."

<laughter>

Mary: I think that was our group.

Ms. Gallagher: "I quit. This isn't working."

Dan: Tara.

<laughter>

Dan: She never said that.

Ms. Gallagher: Your group said that I think a couple of times. But that's actually a fun quote because that's the nature of science. It can actually be very frustrating. You guys had two days to do a lab. Think about someone who is doing a lab for like two years.

Dan: Who's doing a lab for two years?

Ms. Gallagher: Scientists typically work on experiments a lot longer than two days.

Dan: Probably more complicated than baking soda and vinegar and water.

Jack: A little bit.

Kelly: Yeah, they work with like AIDS.

Ms. Gallagher: "You idiot." I'm not calling you that; I'm just reading it.

<laughter>

Ms. Gallagher: People are looking at me like… "You [fool]," that was the next one.

Jack: Who says that? Why is everyone so mean to each other?

Ms. Gallagher: "Don't say anything stupid. Ms. Gallagher's listening."

<huge laughter>

Ms. Gallagher: Yes, I am listening. And don't start whispering 'cause this is a really fun part of the class, but you also don't have to say really stupid things. Just be normal. Just actually be yourselves.

<overlapping conversation>

Ms. Gallagher: What is?

Kelly: The fact that like everything we say is probably gonna go up on the white board.

Mary: I like it though.

Kelly: It's funny except like we probably don't realize this is us.

Ms. Gallagher: They're all my classes put together but a lot of you recognize some of things that were said.

<overlapping conversation>

Ms. Gallagher: Okay, there's only two to three minutes left so I'm not going to talk about the lab report. I'll do that first thing next class. Um, you've got a test coming up next week.