Assessment Commentary Directions: Respond to the prompts below (no more than 10 single-spaced pages, including prompts) by typing your responses within the brackets following each prompt. Do not delete or alter the prompts; both the prompts and your responses are included in the total page count allowed. Refer to the evidence chart in the handbook to ensure that this document complies with all format specifications. Pages exceeding the maximum will not be scored.

1. Analyzing Student Learning

   a. Identify the specific standards/objectives measured by the assessment you chose for analysis.

   [Standards:

   The Living Environment Core Curriculum
   Standard 1: Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions. Key Ideas 2 & 3
   Standard 4: Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science. Key Idea

   WCSD Standards and Outcomes 7-12
   1. Develop abilities in science
   2. Be able to apply science knowledge and skills to a variety of purposes
   3. Understand the unity and diversity among living things

   Common Core Writing Standards
   1.Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. Explore and inquire into areas of interest to formulate an argument.

   Objectives:
   Students will…

   Part 1
   1) Create hypotheses regarding the theory of diffusion through a semi permeable membrane.
   2) Apply the concepts of diffusion to develop solutions and support claims about the process of diffusion.
   3) Observe the process of diffusion and apply scientific theories to explain what they see.
   4) Test hypotheses by determining the presence of simple sugars and starch in a solution using chemical indicators.

   Part 2
   1) Explain how diffusion of water plays a role in several real-world situations by answering analysis questions.
   2) Prepare wet-mount slides and use appropriate stain techniques to test theories of osmosis.
   3) Make observations about biological processes when viewing diffusion in an onion cell.
   4)

   b. Provide the evaluation criteria you used to analyze student learning.

   [The evaluation criteria used for this assessment is a point system. All of the labs that the students have completed throughout this course have been graded in the same way. Students...
understand that different aspects of the lab will be worth more or less points depending on the cognitive complexity and how much information the question is asking for.

For this lab the point system is based off of a one hundred-point scale. The lab begins by asking students to make a prediction. As I introduced the lab to students I told them to make their prediction in the form of a hypothesis. This requires them to use an "If... then" statement. The creation of the hypothesis is worth 5 points. This weighs heavy for a short sentence because it is important for students to be able to create a solid hypothesis to be tested during an experiment, the same way scientists do. This helps them understand scientific languages and writing and also prepares them for future high school and possibly college level science courses. They will receive 2 points for the "If...then" format and another 3 for accuracy and correctness.

Throughout the lab there are instances where students are asked to draw their observations and then label and color what they saw. Students will receive a point for each label and a point for correct coloring. They will also receive one point for accuracy and correctness. There are seven images included in this lab packet that students are expected to draw, label, color, and complete. This is a great way for more visual learners to gain points in a way that may be easier for them to comprehend.

These labs also consist of concept check questions placed periodically throughout the lab after students complete certain tasks. The points allotted to these questions depends on how much information the question is asking students to include in their answers. For example, one question asks, "Did any starch diffuse out of the cell? Explain how you can tell." This is a two-part question that requires a two-point answer. The student will receive 1 point if they tell whether or not the starch diffused through and then 1 point for their explanation of why this happened.

At the end of this lab there are six analysis questions that require students to use what they learned to draw conclusions and formulate arguments. These questions are worth more points because they require elaboration and complex thinking. Each of these is worth 6 points because the responses require multiple component answers. Partial credit is available for these questions depending on how well their response encompasses the important required components.

c. Provide a graphic (table or chart) or narrative that summarizes student learning for your whole class. Be sure to summarize student learning for all evaluation criteria described above.

The following table organizes the assessment information based on the evaluation criteria described above. This table is organized based on the objectives for this lesson and the questions that meet the expectations of each objective. Each student is represented in column one and the total amount of points they received per objective is recorded in their row. The lowest scores are bolded and red. Scores the represent maximum available points are green and bolded. This helps me to notice problem areas and also areas in which students excelled. The last row represents the class average per objective. This is another way for me to be sure that the majority of the class is meeting the objectives for this lesson. I can use this table to summarize assessment results, provide feedback to my students, and create future learning experiences that will benefit all of my individual students. For example, only 3 students of the 29 received full points for the analysis questions. This shows me that the majority of the students had some issues and this might be an area of the lab that I should go over more thoroughly when I meet with the students again. Though this is the case it is expected because these questions were more of a challenge for the students because they require higher-level thinking.
<table>
<thead>
<tr>
<th>Student Learning Objective</th>
<th>Part 1</th>
<th>Part 2</th>
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<tr>
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<td>Objective 1</td>
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| Class Average Per Question | 4.62 | 4.03 | 7.34 | 16.03 | 28.66 | 18 3/4 |

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d. Use evidence found in the 3 student work samples and the whole class summary to analyze the patterns of learning for the whole class and differences for groups or individual learners relative to

- conceptual understanding
- use of scientific practices during inquiry
- evidence-based argument about a scientific phenomenon

Consider what students understand and do well, and where they continue to struggle (e.g., common errors, confusions, need for greater challenge).

[One of the questions in this lab asks students to design their own experiment to test certain variables. The question states, "What test would you need to perform to prove that it is the combination of glucose and the Glucose Indicator Solution that changes color when heated and not just the glucose or the Glucose Indicator Solution alone? Support your answer with an explanation." This question challenges students because they must take evidence from the lab to create a test that they could use to distinguish how the Glucose Indicator Solution works. This is a great question, especially for an honors level course, but many students struggled with it.

I found that when students got to this question they often asked for my help because they could not figure it out. Though, they initially struggled, once I explained the question to them again in my own words, most of them saw what they needed to do. Other students needed a little more assistance. In these cases I used questioning to help them reach the answer. I asked them what happened when they heated the Glucose Indicator Solution and glucose together. The response I received was that there was a color change. Then I asked why that color change happened. They would tell me because glucose is present and then I asked what if glucose was not present? Usually at this point, the student caught on to how they could answer the question. I then left the student to work with their group mates because I want them to find the answer themselves. I gave them important information that they needed and guided them towards the answer. Between my redirection and the peer support within each group students were able to find an answer. Though many were successful, there were still a number of students that did not correctly respond to this part of the lab. This was a nice challenge for the students.

The analysis questions located at the end of the laboratory packet seemed to be another challenge for the students. These required cognitive complexity and quality explanations of scientific concepts in real world scenarios. As the students finished the lab experiment they were given the rest of class time to complete the analysis questions. Many students were concerned because they were struggling to make connections between what they learned and situations that occur daily.

The best example of this challenge is seen in analysis question number three. This question states, "When a person in the hospital is given fluid intravenously (an I.V.), the fluid is typically a saline (salt) solution with about the same water concentration as human body tissue. Explain how the use of distiller water in place of the saline solution would be expected to upset the patient's homeostasis. Your answer should refer to the process of diffusion." In order to receive all six points for this question student must identify the toxicity of the distilled water solution compared to human blood, how diffusion would occur, and how this would affect the human cell. Though these students have all the information they need to answer this question many of them could not connect their knowledge to this real world scenario.

Once I realized that this was a common trend throughout the class I decided to go over how to find the answer on the front white board. Between my prompts and students' volunteering their answers we were able to come up with a response together. The students needed guidance and I felt that, even though I did not want to take away from the challenge of this question, I should provide the support they need to find the answer. I also felt that by going over
this question as a class, students would see how they could use the same process to find answers to the other analysis questions. This seemed to work well. Between my guidance and peer support within each cooperative lab group students were able to analyze their results and use their knowledge to answer the other five analysis questions.

2. **Feedback to Guide Further Learning**

Refer to specific evidence of submitted feedback to support your explanations.

a. In what form did you submit your evidence of feedback for the 3 focus students? *(Delete choices that do not apply.)*
   - Written directly on work samples or in a separate document

b. Explain how feedback provided to the 3 focus students addresses their individual strengths and needs relative to the standards/objectives measured.

The new Common Core standards for writing promote opportunities for students to write arguments to support claims using analysis and reasoning that are based on evidence. The first student response provided in this lab is a hypothesis where students predict what they believe will happen during this experiment. When writing a hypothesis it is important that students use the correct “If…then” format and also avoid first person language. Prior to this lab these students learned how to write a hypothesis so they are expected to create these predictions using the appropriate format and language.

The majority of the students in this class provided hypotheses in the correct format. This is true for my three focus students but student C used the word "I" within his sentence. In order to deal with this mistake, I reminded him, with a written comment, that it is not appropriate to use first person language in a hypothesis. This student will have the opportunity to correct his hypothesis after he receives his lab packet back graded. For each student who used the correct format on their hypothesis I provided positive feedback through written comments to reinforce their success and correct response.

Student C is a student with special needs. This was important for me to consider as I graded his lab because he may need prompts to help him find the correct answer and realize his mistakes. For this reason, I wrote a lot of comments on his paper. For question number 8 in part 2, Diffusion of Water Across a Membrane, the student was asked to describe the changes in the cell when it is exposed to a salt solution. This student had the correct approach in describing the solutions as hyper and hypotonic but he did not correctly identify each. This is a very confusing concept to understand and students often get confused with identifying the different types of solutions based on solute concentration and not water concentration.

In order to provide helpful feedback to student C I wrote short hand definitions and drew him a picture that would help him visualize what he saw in the lab and compare it to his knowledge. Student B also struggled with this same question and concept. This student is considered my "average" focus student so I adapted my feedback to challenge her. Instead of providing the definition and a picture for her as I did student C, I only provided her with my short hand definition and then a short reminder about identifying solutions. I wrote, "Don't forget tonicity is based on solute concentration not water concentration." From this information and the time allotted to ask me questions during class, this student will be able to correct her mistakes and learn from them.

Student A, my exceptional focus student, did not mention tonicity in her answer to this same question. The question does not specifically require it so she did receive full credit but I attempted to challenge her with my feedback. She described that the cell shriveled and the plasma membrane pulled away from the cell wall. I mentioned the name of this process multiple times throughout the lab and during lesson plan 4. This is why I challenge her to name it by writing, "Good, and what do we call this process of the membrane pulling away from the cell
wall?” This is one way to provide her with feedback even though she answered the question correctly.

It is imperative that students recognize the mistakes in their answers to this question because the objectives for this assessment stress that students should be able to apply scientific concepts to make predictions and provide explanations. For this particular question they must apply what they know about osmosis to what they observe during scientific inquiry. This question also addresses the standards, which expect students to use inquiry and analysis to practice science skills. The students need to recognize scientific phenomenon within their lab in order to draw conclusions. By providing the individualized feedback that I spoke of above to each of my focus students I am promoting learning based on what I know about them and the standards and objectives that this assessment is based on.

c. How will you support students to apply the feedback to guide improvement, either within the learning segment or at a later time?

The students received their lab packets back graded with written feedback. The feedback in written in red ink in order for them to differentiate between feedback and their own work. In the work examples provided the feedback is highlighted. I gave them class time to review their packet and ask me any questions they had. Then students were instructed to take their labs home for the night and make corrections based on the written feedback provided to them. They will receive 5 extra credit points if they complete these corrections. The feedback written on their packets will help them to realize what is wrong and also guide them towards the correct answer. This was one way that I supported student learning and guided them to apply the feedback from their lab to their knowledge and scientific concepts.

On specific example of this can be seen in the feedback that I provided to student B on analysis question, 3. As I described above, this was a question that many students struggled with so we completed it as a class. Student B did not provide an answer to this question and this lost her six points. The fact that she did not provide an answer concerns me not only because we went over it as a class but also because by providing me with an answer she is demonstrating her ability to apply scientific concepts to real world scenarios which is a key objective of this lesson. In order to address this I wrote “Why is this answer incomplete? We went over it as a class. Please, see me!” I want this student to see me when she receives her grade back so that I can emphasize the importance of staying on task during class. If she were on task she would have the correct answer to this question, considering I went over it with them. I also want to address this to ensure understanding of the concept. I want to be sure she understands. I asked this student to please include this in her lab corrections so that I have evidence of her understanding and also let her know that if she needs further clarification I am here for support.

3. Evidence of Language Understanding and Use

You may provide evidence of students’ language use from ONE, TWO OR ALL THREE of the following sources:

1. Use video clips from Task 2 and provide time-stamp references for language use.

2. Submit an additional video file named “Language Use” of no more than 5 minutes in length and provide time-stamp references for student language use (this can be footage of one or more students’ language use). Submit the clip in Task 3 Part B.

3. Use the student work samples analyzed in Task 3 and cite language use.
When responding to the prompt below, use concrete examples from the video clips (using timestamp references) and/or student work samples as evidence. Evidence from the clips may focus on one or more students.

- Explain and provide evidence for the extent to which your students were able to use or struggled to use language (selected function, vocabulary and/or symbols, and additional identified language demands from Task 1) to develop content understandings.

  The struggles that students faced when attempting to explain tonicity levels of different solutions is a very common trend throughout this assessment. I attempt to help them use the appropriate scientific language by adding to their response without taking off points. For example, in the analysis questions student B often used the term “hypertonic cell.” Though I may understand what she is trying to express, it is not the correct use of scientific language and vocabulary. The student should say that the inside of the cell is hypertonic to the outside solution. I explained this to students during lesson plan 3 and also at the beginning of this lesson, as well as played a video that emphasizes this idea. I also wrote on her lab to see me if she is unclear about this correction. I do this in order to ensure language and vocabulary comprehension and promote science literacy.

  Though there are times when language use needs to be critiqued I also felt it was important to provide positive feedback when students provided answers with good sentence structure and use of vocabulary. For example, all three focus students used the correct format for their hypotheses. I left a comment praising this to emphasize its importance and their well-written sentence. Another example of this positive feedback is seen in student B’s lab packet. I wrote, “I like your use of vocabulary, full sentences, and thorough explanation.” I felt this was an exemplary response and deserved emphasis and positive feedback. This is also seen throughout student C’s lab packet because she often provides comprehensive, well-written responses.

4. Using Assessment to Inform Instruction

   a. Based on your analysis of student learning presented in prompts 1c–d, describe next steps for instruction

   - for the whole class
   - for the 3 focus students and other individuals/groups with specific needs

   Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs, English language learners, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students needing greater support or challenge).

   I believe the next step to promote the learning of these concepts is to make use of different teaching methods to target problem areas and misconceptions. The first aspect of the lab that I wish to approach is tonicity. After analyzing the data that I collected from this assessment, I realized that tonicity of solutions is a very hard concept for students to grasp. Multiple students explained tonicity wrong or identified solutions incorrectly. I expected this prior to the lesson and decided to show a video as an introduction to this lab. The video reviewed these concepts for the students and presented them in a simple and easy way for the students to understand. This video and the information presented to students the lesson before this one was not enough reinforcement for some students. For this reason, I created a graphic organizer to help students organize this information in order to study for the test.

   I decided to use it as a do now for the next class period. This was a great way to help students organize their information and look at it in another way. As we went over this do now, I
related the concepts to the lab and the aspects of it that students struggled with. This graphic organizer is in the form of a table that summarizes important information about hypotonic, hypertonic, and isotonic solutions. This graphic organizer is useful in differentiating the content for the different types of learners in my class. It includes visuals to accommodate for those students who are more visual learners. From the evidence of student learning that my assessment provided I was able to adapt instruction and be sure to emphasize certain concepts before moving on to new material. It was especially important to not move in before I knew students grasped these concepts because the chapter test was two days after this lesson. I advised students that they should use this graphic organizer as a study tool for the test.

Through my observations of student progress throughout the lab I found that many students struggled to answer the question on page 2 of the lab that asks students to create an experimental test the use of the Glucose Indicator Solution. Though I was able to help many of the students during the lab I wanted to reinforce the thought process necessary to answer this question. In order to review this, on the day students received their labs back, I asked students to volunteer to explain how they answered this question to their classmates. This was a great way for students to hear the answer in another student's language and then compare it to the answer they had written. I felt this was important to go over because create an experiment is a skill students in this course and at this level should understand.

The last aspect of the lab that I felt needed to be reviewed before moving on to new content was the analysis question section. In general some of these questions were harder than others and the majority of students struggled with the analysis questions. I decided to go over these questions as a class. We used the front whiteboard to organize information and I had student volunteers explain their answers. I knew which students to call on based on the assessments that I graded. This seemed to be helpful to all students because even if they got the answer correct from the start, it still reinforced concepts.

After completing these extra reviews based on evidence from the assessment, I conducted a short discussion about the lab and the general conclusions. Then I continued on to finish up some notes and review for the test that was coming up.

b. Explain how these next steps follow from your analysis of student learning. Support your explanation with principles from research and/or theory.

[These steps follow from my analysis because I took into consideration what I have learned from the assessment. The table provided above shows me where students lost points and where they excelled based on the objectives. This is useful to ensure that students are meeting all of the expectations. From this I learned that they struggled with the analysis questions and this is one of the reasons why I would want to review this information for them. A lot of my decisions for the next steps are based off of what I learned during the lab from questioning and observation.

Many of the misconceptions and the patterns of misunderstanding that I observed throughout the lab are areas in which students did not do as well on the lab. This is one of the main reasons that I decided which concepts needed to be reinforced. It is also important to remember that students had peer supports during this lab that helped them record the correct answer in their lab packet. So even though many students did well on their drawings and labeling, some of them are unable to explain what is actually happening. One example of this is tonicity and this is why I felt it was important to review this information again.

Spending a day reviewing the lab is important because there is a lot of feedback and review to be done. Having students share correct answers with their classmate is one way for me to differentiate the presentation of this information. If students hear an explanation from their peers they may be more likely to understand it. This is also a way for me to promote participation and confidence by praising students for sharing their correct answers.]