Assessment Commentary Directions: Respond to the prompts below (no more than 8 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 from the lesson plans measured by the assessment chosen for analysis.

      [The Common Core Standard addressed in this assessment is as follows:

      CCSS.Math.Content.5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

      For this assessment, I’m looking to see if students will be able to solve a numerical expression using the order of operations and if they will be able to explain their thinking process in written format.]

   b. Provide the evaluation criteria you are using to analyze the student learning.

      [The assessment I am using is a problem of the day question where the teacher checks for understanding from the previous lesson. Using a projector I will project the question onto the board for students to begin solving on loose-leaf paper, which is collected at the end of class. I used a checklist to analyze my students learning for solving the numerical expression 12 x 2 + 8 / 2 =?. I would first look to see if the students were able to evaluate the equation and determine there were no parentheses or exponents. Next, I would look to see if they identified multiplication or division as the next step. The students should be able to say that they need to work from left to right because multiplication nor division has precedence over one another. The students should be able to identify 12 x 4 needs to be solved first followed by 8 / 2. Finally, the students should be able to identify addition and subtraction as the next step in the order of operations. Since there is no subtraction they simply need to add 24 + 4 to find a final answer of 28. If the students can incorporate these points they will receive full marks for their question.]

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

      [After assessing all students samples, fourteen students received full marks for their answers. They were able to solve the question correctly and fully explain their reasoning using the criteria listed in the previous question. One student answered the problem correctly but did not write an explanation. This student is my student with the 504 plan where they have trouble writing their answers. To accommodate this student, I went over the question verbally and asked them to explain their thinking. The student could articulate their ideas verbally but had trouble writing or typing them out. This does not mean that this student did not understand the problem but needed further clarification and attention. Six students answered the problem correctly but made a few errors in their explanations. Four of the six students were able to solve the question correctly but believed multiplication came before division and did not mention working from left to right. Two of the six students also answered the question correctly but inserted parentheses into the equation to help distinguish what came first. For example, these students rewrote their problem as (12 x 2) + (8 /2) = ?, while this is an acceptable strategy if it helps these students process the information, I would want to clarify any misconceptions. Two students copied the problem incorrectly but even though they copied the problem incorrectly]
they were able to correctly solve the problems they did copy and explain how they found their answer. This tells me that even though they were unable to solve the original problem they were still able to apply the order of operations. Seven students answered the questioned incorrectly but explained their answers in a way where I could understand their thinking. They were common misconceptions about the order of operations. For example, a few students multiplied 12 x 2 but then took their answer of 24 and divided it by 2 and then adding 8. These seven students represent many of my struggling students in math. Further clarification and support will be administered to these students during tiered support. One student answered the problem incorrectly but did not explain their work. On the paper this student’s answer was written I could see the mathematical work, and know that this student had problems with where to start solving the problem. Two students were absent form this activity. ]

- 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
  - procedural fluency
  - reasoning/problem solving skills

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

In the first student sample, I would award this student full marks for their answer. I can see that they used a strategy we reviewed in class and wrote PEMDAS near the top of their paper which was also written on many student’s papers. What I really noticed about this particular paper is how this student grouped the rules together by labelling ‘P’ as one, ‘E’ as two, ‘M’ and ‘D’ as three, and ‘A’ and ‘S’ as four. This student showed conceptual understanding by acknowledging that multiplication and division did not have precedence over one another and when solving the problem you would needed to work from left to right. This student showed procedural fluency by working through each step of the order of operations and coming to the correct answer of 28. This student showed reasoning and problem solving skills by being able to thoroughly explain their answer by writing out a detailed explanation of their thought process. For these students, I might differentiate the problem of the day and ask them to solve a more difficult problem using nested parentheses and exponents.

In the second student example, although the student was able to solve the expression and find the correct answer, the students explanation could cause confusion on future problems. In the second step the student says, “Then, I divided because the step after multiplying is dividing.” This deals with the students conceptual understanding of the order of operations. I need to address this misconception with not only this particular student but a few others as well that multiplication does not have precedence over division. Instead of considering them as separate steps I would need to explain you would solve each multiplication or division expression from which comes first left to right. This also needs to be made clear with addition and subtraction. Although this is a common misconception, I do think that once this matter is addressed with these students this will clarify any conceptual misunderstandings. However, I think in terms of procedural fluency and problem solving skills this student is on the right path. They are working through the rules for the order of operations, solving each step, and they are able to articulate what they are doing to solve the expression.

In the third student sample, for the majority of students who struggled with this problem their mistakes were similar to the answer reflected on this student’s work. These students are struggling in their conceptual understanding and procedural fluency. This student is following
the order of operations by doing multiplication of 12 x 4 and then division 24/2 but they are not making the connection that when looking for division they should be dividing 8/2 instead of changing the entire expression by dividing 24 by 2. I think in this case, it would have been beneficial to model my thinking and work through an example as a class before moving into small groups.]

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

[For the first student sample, I highlighted the students strengths. I told this student that I liked how thorough this student was in their explanation and specifically highlighted what I thought made the students answer articulate the concept of the order or operations. In this case, the student mentioned that the third step is to multiply or divide depending what comes first left from right. This students answer aligned directly with my objectives and standards.

For the second student sample, the student took all the steps they needed to solve the problem. I wanted to address their strengths in explaining how they applied the order of operations but I also wanted to address a quick misunderstanding. I just wrote a short note reminding the student that step three is multiplication or division depending on what comes first from left to right and making the connection to addition and subtraction.

For the third student sample, although this student had made a great start to the beginning of her answer there was some confusion on how to work through step three. I thought I needed to be more direct in order to address the standards and objectives related to this question and show the student exactly what I was expecting and how to get there. That is why I solved the rest of the equation as part of this students feedback so this student could see how the rules for the order of operations translate when solving a problem or expression.]

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

[At a later time, I would want to revisit this kind of problem. On the students’ quiz, I will include another numerical expression and also ask students to explain their thought process while solving the problem using the order of operations. By having them do a similar problem on a more formal assessment it will allow me to analyze whether the students were able to understand and interpret my comments to improve their conceptual understanding and procedural fluency. I would incorporate the quiz after I had addressed individual learner needs for student work samples two and three during tiered support.]
Explain the extent to which your students were able to use language (selected function, vocabulary, and additional identified demands) to develop content understandings.

My assessment focused on if students would be able to solve a numerical expression using the order of operations and if they would be able to explain their thinking process in written format. The students also needed to articulate their answers in paragraph form. Additionally, students needed to integrate mathematical vocabulary into their explanations. For example, they will need to use vocabulary terms like parentheses, nested parentheses, exponents, multiplication, division, addition, and subtraction.

The students were able to articulate and provide evidence of language understanding and use in the three work samples. While some ideas and misconceptions needed to be clarified with some students, the majority of students were able to articulate and explain how they used the order of operations to solve a numerical expression. Not only were they able to explain how they used the order of operations to solve the expression but they were also able to incorporate other vocabulary like multiplication/multiply, division/divide, addition/add, and subtraction/subtract.

By using this language function, it helped students to stop and think about the process they used when applying the order of operations. It allowed them to articulate their ideas and how they applied each step to solve the expression. It also helped me as a teacher see how what students knew and where my instruction needed to be clarified.

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).

For the whole class, my next plans for instruction would be to incorporate different problems for the order of operations and have students work in small mixed groups to solve these problems. This way students are being exposed to different groups as well as different types of problems not just the ones focused on in lesson two. I would use this time to clarify any misconceptions that were discovered from the problem of the day.

For the fourteen students who excelled on the problem of the day, I will work towards providing more challenging questions. I want them to be able to confident in the delivery of their answers and also strive to apply their knowledge to more difficult problems. Tiered support is offered at the end of the day and is designed for the teacher to provide additional support to students who may need additional intervention that can not be covered during class time. I would organize the students according to what was written in their problem of the day and have small group support for these students.

For the six students who answered the problem correctly, but needed additional help with their explanations that was illustrated with student sample two, I would do a mini-lesson. First, I would review the order of operations and ask students to go over each step. Then, I would work through a couple examples together and ask students to explain their thinking for each step. I would make sure to answer any remaining questions or needed clarifications the students might have.
For my group of students reflected in the third work sample, I would again have a small group mini-lesson during tiered support. I would review the order of operations and ask students to explain each step in their own words. Together as a small group we would work through a few different examples and I would make sure each student explains their thinking for each step. I would again make sure to answer any remaining questions or needed clarifications the students might have. For this group, I would give an exit slip asking the students to solve the problem and again explain their thinking to be done individually. This will allow me to review their answers and see if further intervention is needed.

I think it's important that within each group I need to focus on each student as an individual and if my small group mini lesson is still not a success for some students, I will need to work one-on-one with each child so they feel comfortable analyzing the material and solving the problems using the concepts we have covered in class. For the student who answered the problem incorrectly and did not write an explanation, I know that this student is someone who struggles in their academic work. I would not have this student participate in a small group because I feel they need a one-on-one intervention. This would consist of either myself or the special education teacher working through a number of problems together with this student to clarify conceptual misunderstands and promote procedural fluency using the order of operations.

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

Vygotsky advocated for the zone of proximal development that illustrates the space between what a student is capable of doing independently and the scaffolding of knowledge from the guide in this case the teacher. Through my mini-lessons with the small groups, I am trying to guide the students learning from what they are capable of doing and providing supports to scaffold the new material. Vygotsky also argues that students learn very little when they perform tasks they can already do independently. This is why I want to challenge the students who are already capable of applying the rules for the order of operations and who can explain their thought process when working through their answers.

I believe we need to teach to the student. My professor, Dr. Bean, stated that while whole class instruction can be beneficial, it is also important to recognize the differences between students. Everyone learns in different ways and paces, it is the teacher who must recognize these characteristics and plan accordingly. We need to be able to relate to our students and see them for who they are as an individual. Learning should be varied with the teacher modeling and guiding the students to independence during class time. I want to set high expectations and goals, teach an engaging and challenging curriculum but also find a balance where I can assist each individual student which is what I try to do during tiered support.