RUBRIC EXAMPLES FOR ANALYSIS OF LEARNING
INTRODUCTION

The two examples shown below received a "3" on the "Analysis of Learning" section of the level II Teacher Work Sample. Both examples successfully address all the key elements of the prompt. In the "Whole Class" section of both examples, the learning goals are restated for the convenience of the reader, the evidence of learning is organized around the learning goals, and detailed descriptions of student performance in relationship to the learning goals are given. Furthermore, the evidence of student learning comes from multiple assessments, e.g. observations, student discussion, student worksheets, and quizzes. When discussing Student X and Y, these two participants again explicitly discuss to what degree these individual students met the learning goals and give detailed and specific information to support their assertions.

THE TWO EXAMPLES

EXAMPLE 1

Analysis of Learning Results

TWS Standard

•*The teacher candidate uses assessment data to profile student learning and communicate information about student progress and achievement*

Whole Class: Use the assessment data you collected to draw conclusions about the extent to which the whole class attained all learning goals. Support all claims about student learning with observable data (e.g. student writing, test results, specific student comments, or observed student performances) Include samples of student work if available. (Attach these in the appendix.)

Lesson/Learning Goal:
1a. Students will learn the concept of density as it relates to an object's volume and mass by exploring how similar volumes have differing masses.

1b. Students will apply the concept of density of a solid to real-life objects and decide which will sink or float and why, using principles of density to support their decisions.

2a. Students will apply the definition of density to liquids, seeing how liquids of different densities interact.

2b. Students will test objects' relative densities by floating them in different liquids.

The first learning goal concerning the concept of density (1a) was met by some students and not by others. When we discussed density, the students understood that the cans of pop were the same size, or volume, but that their mass changed because one sank and one floated. They understood how the mass of the pop cans affected the density and how the orange peel affected density. One student compared the orange peeling to a "life jacket," keeping the orange afloat. Other students commented on how the hole in the orange might account for water entering it, thus making it sink. The students in the second class had difficulty defining density because I do not think they were completely sure about the relationship between mass and volume. For the first class I provided the definition of

density, which did not necessarily mean the students understood it. A student in the second class got the first portion of the definition: "how much mass" but could not verbalize very well how mass related to volume to form the property of density. When I returned to density during my second lesson, I again asked for a definition of the term. The students verbalized density with respect to the pop cans, telling me how one floated and the other sank. A couple of students in the eighth hour class even mentioned mass and volume in their definitions. Overall, I felt the students understood the *application* of density, but did not necessarily completely understand the *definition* of density and its relationship to mass and volume. My lesson, however, was directed more towards a broader understanding of density, so in that respect, the students were successful.

The students successfully met the second learning objective of the first lesson (1b). They fully understood how and why some things float and others sink, as evidenced on their worksheets. They put an "F" by those they thought would float and an "S" by those that would sink, and most students knew right away which would float and sink, and why. As I circulated around the room, the students discussed ideas and suggested things like, "I think the apple will float because, like the orange, it has a 'life jacket' [the peeling] on it." Others changed their worksheets once they knew what size a certain material appeared. A student changed his answer from float to sink for the piece of wood once he saw the size of the sample of wood. Students could verbalize why they thought a material would sink when they came to the front of the room to test it, and changed their worksheets accordingly to accommodate new information. I had the students apply the concept to items not on the worksheet and list three items that would float, and three that would not. On one worksheet, a student wrote: "50 lb. weight, computer, and egg" for those things that would sink, demonstrating how a denser object would sink. Clearly, she understood that heavy things sink. Her objects that would float also show an interesting understanding of less dense objects: "Easter egg (filled with air), bottle half full of water, baby oil." The latter of these items shows an extension application to an idea we had only briefly covered in this lesson: the concept of liquid density.

The third learning goal (2a) was met satisfactorily, in my opinion. The students easily understood the directions of the lab and predicted well the liquids that floated and sank, using a lot of prior knowledge and observations. Although they understood that oil would float on water, I am not sure how well they related this to density. The students could tell me, when we went over the whole experiment, which liquid was most dense (the corn syrup) and which was less dense (the vegetable oil). They also understood applications of this concept in the real world, relating the separation of less and more dense liquids to foods like yogurt and peanut butter and substances like paint and blood in water. Once again, I think the students relied more on prior knowledge than new information about density to support their predictions and observations.

The students understood part of the last learning goal (2b) through the prediction of relative densities. The students had no trouble predicting and testing where the cork, straw, wax, and penny would float/sink, but did incur a little trouble when relating this back to measuring density with different liquids. I asked the students, at the end of class, to list the objects and liquids from least to most dense. The second class understood that

the cork was least dense, but then did not look at the oil as the next in line. They went to the straw and wax, and then the penny, again skipping the liquids. This could be related in part to how I worded my question, because I do not think I mentioned that the students should consider all substances in their cups. An interesting discussion began when I posited that density applied to gases as well as liquids and solids. Although not a learning goal, this discussion demonstrated their ability to apply these concepts outside of the classroom. The students had good suggestions about gases. One student said, "No, [density does not apply to gases] because you cannot measure it as easily as putting it in water or oil and seeing where it floats." Another student said, "Yes, everything has density, so air would, too." It was an interesting conversation and one that tested the students' ability to critically think. I felt confident that the students had a general introduction to density after the result of my lessons, and overall, met most of the learning goals set forth at the beginning of each lesson.

Individuals: Select two students that represent different levels or kinds of performance. Describe what these students learned in relation to two significant learning goals, one of which must represent higher-level learning. Use specific examples of the students' work including student writing, test results, specific student comments, or your observations to draw conclusions about the extent to which these students attained the learning goals.

Student X

Student X often spoke out in class or was off task during discussion. He usually seemed disinterested in the lesson and would hurry through things to complete them without paying a lot of attention to the content involved in the activity. He and his table partner often joked during the lesson or whispered to each other, and did not always listen to me or their classmates. Student X met the second learning objective relating to the application of density to real-life objects, and was able to articulate, in his own words, what the term density meant (which demonstrates mastery of my first learning objective about the concept of density as it relates to mass and volume) despite not having listened too well during discussion. On the second lesson, he went right to work without looking at his worksheet and so he did not complete each section like his classmates. He did make predictions, but did little else for the results of his experiment. Based on his worksheet, I do not think he met the application of density to liquids learning goal because he did not contribute to discussion nor did he complete the worksheet demonstrating his understanding.

Student Y

Student Y usually did not volunteer information willingly during discussion. If she knew the answer she might occasionally raise her hand, but when she did, she spoke softly. She worked with her group well, and seemed to discuss things with her group mates, but was not very vocal with our discussions. She did, however, understand the learning goals and met the second learning goal of the first lesson in relation to application of density for real-life objects. On her worksheet she wrote "rubber duck with air" for objects that would float, showing she realizes air is often necessary for an object to be less dense than water. Student Y understood the second learning goal for the second lesson about the

relationship between objects and relative density. Her diagram of the cup with all of the objects in it displays that she knows what floated where, and drew in information from her own data on her diagram. She also appeared to have followed along actively in discussion as she listed the objects and their densities from least to most dense.

EXAMPLE 2

Analysis of Learning Results

TWS Standard

•*The teacher candidate uses assessment data to profile student learning and communicate information about student progress and achievement*

Whole Class: Use the assessment data you collected to draw conclusions about the extent to which the whole class attained all learning goals. Support all claims about student learning with observable data (e.g. student writing, test results, specific student comments, or observed student performances) Include samples of student work if available. (Attach these in the appendix.)

Lesson 1

Given one of the five triangles (isosceles, equilateral, right, obtuse, and scalene) students should be able to measure its sides and angles, and define each triangle according to its angles and measures with 100% accuracy.

Students met this goal by the end of the first lesson. Students had worked with protractors before, but they really fine tuned their skills with this activity. I was very impressed with the accuracy with which the students defined each type of triangle. Most groups defined their triangle to near perfection. For example, I would define an equilateral triangle as a triangle in which all sides and all angles are equal. One group defined it as follows: "All sides and all angles are the same. They are all equal."

I also know that the class achieved this learning goal by their scores on the test I gave them at the end of the second lesson. The first part of the test was identification of the five types of triangles. Of the 45 possible points on this section, the class answered 40 correct.

Lesson 2

The first learning goal was that students would be able to construct all the triangles we have learned about with strips of construction paper. They were able to do this. This activity was very good because it was taught at just the right developmental level. (Teaching at the appropriate developmental level is an important aspect of the cognitive learning theory.) Students were challenged by the activity, but were able to have success. I made this conclusion from the reactions I got from the students. They understood the directions and got right to work, but they did not have all the answers right away. As I gave suggestions and hints to the students, I was able to challenge them to think more deeply then they could have on their own.

The second learning goal was that students would be able to identify which of the five

triangles could be combined into one, given the knowledge that one triangle can fit the definition of two different triangle. The students achieved this goal by spending some time exploring the different triangles. They tested out different options. If a group of students found one that worked, I had them write it up on the board. I noticed that, as students started to see their classmates go up to the board to draw their example, they wanted a chance too. This made them intrinsically motivated.

Of the five possible combinations, (equilateral/isosceles, right/scalene, right/isosceles, obtuse/scalene, and obtuse/isosceles) the students recognized four. We ran out of time, so I have them some help with equilateral/isosceles. They all realized they'd missed it right away when I showed them that all equilateral triangles are isosceles. This assured me that, with some more time, they would have figured this one out too. These observations lead me to conclude that the students met the second learning goal as a group, but some individuals did not meat this objective.

The second part of the test that I had the students take asked them to draw some examples of combination triangles. Only two of the four triangles could be drawn, and of the 14 that were attempted, nine were correct. This isn't bad having just learning the material, but I wouldn't say the whole class met the second objective completely.

Students also expressed their understanding in the comments they wrote on the back of the test. These comments indicated to me that many of the students displayed deep understanding of the material presented. For example, one student wrote, "I learned about combining triangles like obtuse isosceles. Some of them don't work like obtuse equilateral." These showed that the class, as a whole, achieved the second learning goal. They were able to identify which triangles can be combined.

Individuals: Select two students that represent different levels or kinds of performance. Describe what these students learned in relation to two significant learning goals, one of which must represent higher-level learning. Use specific examples of the students' work including student writing, test results, specific student comments, or your observations to draw conclusions about the extent to which these students attained the learning goals.

Student X

Objective one stated that students will be able to identify the definitions of all five types of triangles presented in class. I observed that student X was achieving this objective because he was active in answering questions. My observations were proven correct on the test at the end of the second lesson. The first part of the test was a matching section where the students matched each of the five triangles with the correct definition. He got all five correct.

The second goal in lesson two demonstrates higher-level learning. The students don't simply define; they must be able to think abstractly about the different kinds of triangles. They must imagine and draw triangles that have the characteristics of two different triangles at once. Student X indicated that he achieved this objective in his comments on the back of his test. He wrote, "I found out you could combine triangles. Scalene and

equilateral are absolutely different. Obtuse and scalene works really well together. Equilateral and Isosceles work too."

Student Y

Another student didn't represent as high of a level of learning.

For goal one, on triangle identification, this student was quiet during class discussion. There was a lot of wait time from when I would ask him questions, and when he would answer. I would also have to give him hints that lead him to the right answer. This led me to believe that he probably wasn't achieving the goal. This was supported by his test at the end of lesson two. He scored 2 out of 5 on the identification section. This indicated that he had not met the learning goal, since the goal indicated that students would identify with 100% accuracy.

However, this student did show success on the second goal in lesson 2. This goal said that students would be able to identify which triangles combined into one triangle. This student indicated achievement of this goal on his test. There were 4 combination triangles in the second part of the test that the students were asked to draw, if possible. 2 were possible and 2 were not. The student correctly drew the two that were possible, and left the other two blank. This indicated that he met this objective even though he had not met the first and the second objective represented higher level thinking than the first.