Transcript – Combining Student Expectations

Let's take a closer look at how we integrate process standards with content standards to provide richer problems for our students. Choose one of the three content areas to examine more closely. The example problems we are going to look at can be found in your journal.

As you compare and contrast the two examples for your content area, think about the following questions:

- What impact does the mathematical process standard have on the content student expectation?
- What impact does the mathematical process standard have on the way we expect students to respond to questions?

Transcript – Integrating Student Expectations with Mathematical Process Standards

In order to answer these questions, let's look at a specific example of a content standard integrated with the mathematical process standards. Take a moment to identify the page titled *Integrating Student Expectations with Mathematical Process Standards* in your journal and view the clip for Algebra I, Algebra II, or Geometry. Feel free to examine any of the three content areas.

Transcript – Algebra I

Take a moment to complete the first problem on the *Algebra I and the Mathematical Process Standards* page in your journal.

This question is representative of demonstrating an understanding of domain and range. Students are often asked to determine the domain and range of a portion of a quadratic function. When this standard is paired with a mathematical process standard, students may be asked to complete a similar task that connects to a larger mathematical idea.

Now take a moment to complete the second problem on the *Algebra I and the Mathematical Process Standards* page in your journal. How does it compare to the task that is not paired with a mathematical process standard?

This question requires students to consider the impact of the generalized value *c*. In order to answer the questions effectively, students will need to analyze the given information to determine how that value affects each function, and then describe the effect on the function's domain and range. In addition, students will have to consider how different values of *c* affect the equation. Is the effect the same when

c is less than 0 as when *c* is greater than zero? How will students communicate findings, since the task does not prompt a simple answer such as "*y* is greater than negative 3"?

Transcript – Geometry

Take a moment to complete the first problem on the *Geometry and the Mathematical Process Standards* page in your journal.

This question is representative of classifying quadrilaterals. Many students will guess immediately that this figure is a parallelogram, then they will show that both pairs of opposite sides of the figure are parallel by comparing the slopes. Other students may choose to use the distance formula to show that both pairs of opposite sides are congruent. Though these are not the only ways the students could choose to show that *ABCD* is a parallelogram, they are among the most efficient.

When this standard is paired with a mathematical process standard, students may be asked to complete a similar task involving a larger mathematical idea.

Now, take a moment to complete the second problem on the *Geometry and the Mathematical Process Standards* page in your journal. How does it compare to the task that is not paired with a mathematical process standard?

One difference from the initial question is that students are not given the conclusion, that the figure is a parallelogram. This allows students to create an argument that proves it is a parallelogram or one that proves it is not and to discuss their conclusions with their partner. Students will also have to determine whether to use technology, hand-drawn constructions, or other means to communicate their thinking using correct mathematical terminology, symbols, and ideas.

Transcript – Algebra II

Take a moment to complete the first problem on the *Algebra II and the Mathematical Process Standards* page in your journal.

This task is representative of demonstrating an understanding of writing a quadratic function given a set of points. Students could use a graphical, algebraic, or technological approach to complete this task. When this standard is paired with a mathematical process standard, students may be asked to determine an equation that models the situation.

Now take a moment to complete the second problem on the *Algebra II and the Mathematical Process Standards* page in your journal. How does it compare to the task that is not paired with a mathematical process standard?

This task provides the students with a context of a soccer ball being kicked. In order to accurately answer the question, students must identify the function that best models this situation. Once students realize that the model is quadratic, they should determine the function by using algebra or technology

to create a best-fit model. The resulting function can then be used to find how much time elapsed while the ball was 11 feet or more off the ground. The students use process standards to solve this by developing a plan or strategy, executing the plan to determine the solution, and verifying that the solution is a reasonable answer.