Common Core Instructional Shift: Rigor

Narrator: The Common Core Learning Standards in Mathematics outline a trajectory of learning designed to prepare students to graduate from high school college and career ready. In addition to the content and practice standards laid out in the Common Core Learning Standards for Mathematics, educators can focus on three main instructional shifts when planning instruction - rigor, focus, and coherence. This video will explore what it means to increase rigor in the mathematics classroom. The shift towards more rigor in the math classroom has three basic components: conceptual understanding, procedural skill and fluency, and application. For work to be considered more rigorous, classroom teachers need to have an understanding of the interplay among these components to meaningfully integrate all three into curriculum, pedagogy, and assessment.

Establishing a strong conceptual understanding means that students are not simply memorizing simple tricks or rules. It means that when they encounter different types of problems, they use their knowledge and skills in different ways to solve them. To build deep conceptual understanding students need time to struggle with challenging mathematics and opportunities to talk and write about their mathematical thinking. When students are able to access concepts from a number of perspectives, they develop a deeper understanding of core math concepts that can be applied to new situations. Conceptual understanding also supports and contributes to developing fluency. In each grade the standards articulate key fluencies, areas in which students should be able to calculate with speed and accuracy.

To illustrate how conceptual understanding and fluency work together, let's look at this third grade problem. Describe two different ways you can use a calculator with a broken seven key to evaluate the following expression, 4x7. In this example students are expected to perform the calculation four times seven equals 28 quickly and accurately and demonstrate their conceptual understanding of multiplication. Their answer reveals their ability to interpret a product in terms of equal groups and accurately calculate the product. It is important that teachers value students' multiple solution paths in their classrooms. Finally if students are genuinely going to be college and career ready, they need many opportunities to apply their knowledge to non-routine problems in real world situations.

If application is truly rigorous students should be able to independently engage with tasks and apply the appropriate skills without prompting. For example, as seen in this eighth grade math test Jamel and Ashley have two of the most popular phones in the market, a Droid and an iPhone. Jamel's monthly cell phone plan is shown below where C stands for the cost in dollars and T stands with the number of texts sent each month. Jamel: "C equals 60 plus 0.05t". Ashley's plan cost 35 cents per text in addition to a monthly fee of $45. Whose plan, Jamel's or Ashley's cost less if each of them sends 30 texts in a month? Explain how you determined your answer.

In this example, students are not explicitly told how to approach the task. They have the opportunity to apply math in context and choose the appropriate concept for application. Specifically, they have to apply their understanding of expressions and equations in order to solve this real world problem of cost saving. As seen in this video the three components of rigor are interconnected. When students have deep conceptual understanding and are fluent with basic calculations and core functions, they can apply their knowledge to novel problems. By thoughtfully addressing each of these components, educators will increase the level of rigor in the math classroom.