Standards INSTITUTE

Rigor in the Standards-Application

Handout, Grades 6-8

Rigor in the Standards

The *K–8 Publishers' Criteria* gives a high level description of rigor for grades K through 8, and while it is not exhaustive, it is meant to frame your thinking around rigor for this grade band. This "Rigor in the Standards" handout, and the examples contained within, should be used to discuss the meaning, intent, and themes of the major work for this grade band. Use this document as a resource during planning or professional learning opportunities to frame conversations around rigor within this grade band and to reflect on the instructional practices necessary to appropriately attend to rigor in content standards.

"To help students meet the expectations of the Standards, educators will need to pursue, with equal intensity, three aspects of rigor in the major work of each grade: conceptual understanding, procedural skill and fluency, and applications. The word *understand* is used in the Standards to set explicit expectations for conceptual understanding, the word "*fluently"* is used to set explicit expectations for fluency, and the phrase "*real-world problems"* and the star symbol (*) is used to set expectations and flag opportunities for applications and modeling (which is a Standard for Mathematical Practice as well as a content category in High School)." ***—K–8 Publishers' Criteria for the Common Core State Standards for Mathematics***

At UnboundEd, we've studied the state standards, spent time in classrooms, and looked at work done by other organizations to form an understanding of these three aspects of rigor that we think is most useful for educators to understand the standards and shift their practice. So while the words *understand*, *fluently*, and *real-world problems* do indicate the three aspects of rigor, they are not comprehensive. We've come to associate conceptual understanding with higher order thinking skills, working with multiple representations, and teaching more than just computational procedures. Procedural skills are about students accurately performing core functions required for grade-level mathematics; fluency is explicitly called for in certain standards and implies efficiency. Application can be thought of generally as problem solving, in real-world or mathematical contexts. For example, the words *recognize* or *compar*e can be used to indicate conceptual understanding, *count* can indicate procedural skill and fluency, and *solve addition and subtraction word problems* can be used to indicate application. Nevertheless, the example standards here that indicate an aspect of rigor should be used as examples, and are not meant to be a checklist, or keyword indicators.

Additional Aspects of the Rigor and Balance Criterion from the *K–8 Publishers' Criteria*:
(1) The three aspects of rigor are not always separate in materials. (Conceptual understanding needs to underpin fluency work; fluency can be practiced in the context of applications; and applications can build conceptual understanding.)
(2) Nor are the three aspects of rigor always together in materials. (Fluency requires dedicated practice to that end. Rich applications cannot always

be shoehorned into the mathematical topic of the day. And conceptual understanding will not come along for free but must be explicitly taught.)

Application

"Allowing teachers and students using the materials as designed to spend sufficient time working with engaging applications, without losing focus on the major work of each grade. Materials in grades K–8 include an ample number of single-step and multi-step contextual problems that develop the mathematics of the grade, afford opportunities for practice, and engage students in problem solving. Materials for grades 6–8 also include problems in which students must make their own assumptions or simplifications in order to model a situation mathematically. Applications take the form of problems to be worked on individually as well as classroom activities centered on application scenarios. Materials attend thoroughly to those places in the content standards where expectations for multi-step and real-world problems are explicit. Applications in the materials draw only on content knowledge and skills specified in the content standards, with particular stress on applying major work, and a preference for the more fundamental techniques from additional and supporting work. Modeling builds slowly across K–8, and applications are relatively simple in earlier grades. Problems and activities are grade-level appropriate, with a sensible tradeoff between the sophistication of the problem and the difficulty or newness of the content knowledge the student is expected to bring to bear." ***—K–8 Publishers' Criteria for the Common Core State Standards for Mathematics***

The *K–8 Publishers' Criteria* sets expectations for materials to reflect the appropriate aspect of rigor called for in the Standards. In order to ensure instruction reflects the appropriate aspect of rigor, first, we must unpack what rigor looks like in the standards and how instruction might reflect this aspect of rigor. The table below identifies the main goal and effective instructional strategies for application.

Application	
Main goals:	**Effective instructional strategies:**
● Apply skills and understandings to new situations, other subject areas, real-world and problem-solving situations.	o **Problem-solving opportunities:** Provide time for student to work on tasks independently, with a partner, or in small groups with consistent teacher feedback. o **Share multiple solution methods:** Facilitate classroom discussions where students share, explain, and justify a variety of problem solving strategies and/or solutions. o **Intentionally integrate content:** Provide learning opportunities for students to apply their knowledge of multiple standards, clusters, or domains.
Source: **Achievement Network** https://static1.squarespace.com/static/5321dc4ae4b0c72ad0ceedfe/t/59c4179537c5811bd8d9000c/1506023318140/Instructional+Approaches+for+Math+Rigor.pdf Retrieved Nov. 9, 2018	

The examples below are standards within grades 6–8 that indicate application. Each example provided highlights language in the standard that indicates the aspect of rigor, rationale for why this standard indicates the aspect of rigor, other standards that similarly reflect the aspect of rigor, and additional information that helps to articulate the nuance of the Standards and helps to paint a more complete picture of rigor for this grade band. Language in the standard that reflects a different aspect of rigor than the one being highlighted has been grayed.

Language of the standards that indicates application:	
Solve...problems 6.RP.A.3.B **Solve** unit rate **problems** including those involving unit pricing and constant speed. ***For example,*** *if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*	
Rationale:	Addresses the application aspect of rigor because students need to able to solve a real-world scenario using ratio reasoning. In 6.RP.A.3.B, students solve unit rate problems in the context of unit pricing and constant speed.
Standards:	7.EE.B.3, 7.RP.A.3, 8.EE.C.8.C

Language of the standards that indicates application:	
Real-world problems 6.EE.C.9 **Use variables** to represent two quantities **in a real-world problem** that change in relationship to one another; **write an equation** to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. **Analyze** the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. **For example**, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.	
Rationale:	Addresses the application aspect of rigor because students need to able to solve a real-world problem using the conceptual knowledge they have previously developed. In 6.EE.C.9, students use their understanding of the relationship between dependent and independent variables, equations, and graphs to work problems such as constant speed.
Standards:	7.EE.B.3