Elements of Rigor

Conceptual Understanding:

Conceptual understanding refers to the kind of thinking that demonstrates understanding of the underlying mathematics in a situation and is an important part of learning mathematics deeply. Conceptual understanding provides flexibility in thinking about mathematics. It can be assessed at a variety of DOK levels. A conceptual question at DOK 1 might use a basic definition. A higher level DOK question would require students to engage in mathematical practices such as making conjectures based on their understanding of mathematics or constructing an argument. Conceptual understanding can be seen when students connect different representations of mathematical ideas, such as graphs, tables, and equations or when they answer questions such as "why?" or "under what conditions?" Standards that begin with verbs such as understand, explain, or identify most likely fall into the conceptual category.

Procedural Skill and Fluency:

Procedural skill and fluency refer to demonstrations of completing mathematical processes such as solving arithmetic problems or manipulating algebraic expressions. Procedures are often rooted in algorithms, but may also be evident where students use repeated reasoning to solve problems. Procedural skill and fluency include efficiency and accuracy. Standards that begin with verbs such as solve, calculate, or construct most likely fall into the procedural skill and fluency category.

Applications and Modeling:

Applications and modeling are student demonstrations of applying mathematics to contextual problems. These problems engage students in problem solving and often include multiple steps and complex thinking. Applications come from a variety of academic subject areas such as science or social studies and can also be rooted in real life scenarios. Standards that begin with verbs such as use, apply, or model most likely fall into the applications and modeling category.