Cracking the Code (Mathematics) – What Does It Mean for Me?

Grades K – 5

(Prompts and Suggested Responses)

Now that you have viewed the Cracking the Code Power Point, you will revisit some of the essential points of the presentation in order to expand your learning and create a common vocabulary. To do this, you will engage in an exercise that enables you to interact with the Common Core State Standards (CCSS) for your particular grade span (K-5, 6-8, high school).

With your grade level/span colleagues you will complete and discuss a collection of tasks aimed at contextualizing the information from Cracking the Code. Following this exercise, you will be asked to reflect on your experience and consider actions that you will be able to take as a result of your new learning.

1. The Power Point states that there are three major components to the CCSS for Mathematics: Standards for Mathematical Practice, Standards for Mathematical Content, and a Glossary. The Standards for Mathematical Practice are described on pages 6-8 of the document. They trace their lineage to “processes and proficiencies” from two well regarded sources. **Name these two sources and discuss the “processes and proficiencies” as they currently apply to your practice.**

   **Suggested Response:**
   - NCTM process standards: problem solving, reasoning and proof, communication, representation, and connections
   - Strands of mathematical proficiency specified in the National Research Council’s report Adding It Up: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy).

2. The eight Standards for Mathematical Practice appear repeatedly throughout the document, but are only described on pages 6-8. These descriptions relate “how” mathematically proficient students engage in the study of mathematics. **Skim through the descriptions of these two practices: “Construct viable arguments and critique the reasoning of others” and “Look for and express regularity in repeated reasoning.” Cite examples of how the practices may be displayed by an elementary student.**

   **Suggested Response:**
   - **Construct viable arguments and critique the reasoning of others:** Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions.
   - **Look for and express regularity in repeated reasoning:** Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again and conclude they have a repeating decimal.
3. As visually depicted in the Venn diagram in “Cracking the Code”, the Standards for Mathematical Practice and the Standards for Mathematical Content should be intertwined during instruction. The concluding paragraphs of the Standards for Mathematical Practice offer guidance as to when the content standards lend themselves to integration with the practices. What word in the content expectations signal a prime opportunity to link these two sets of standards? Why do you think this is the case?

Suggested Response:
- Understand. The Mathematical Practices are behaviors that students should increasingly engage in as they become more mature practitioners of mathematics. They assist in deepening a student’s understanding of content and their ability to apply their knowledge in new, non-routine, and practical situations. The CCSS for Mathematics call for a “balanced combination of procedure and understanding”. If a student lacks a deep understanding of content they may be inclined to rely too heavily on procedural knowledge thus hindering their ability to truly use mathematics. Often the content standards that include the word “understand” are those that are foundational to the discipline of mathematics and “merit” focused attention.

4. Standards for each grade level (K-8) begin with an introductory page. These pages cite several critical areas of instruction for the grade level. Locate the introduction page for grade 2 and/or your grade level. List the critical areas of instruction. Share your overall impression to this content with your group.

Sample Response:
- In Grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.

5. Domains are large groups of related standards. Some domains range across grades K-5 like Measurement and Data, while other domains span only a few grades (Number and Operations – Fractions). In the K-5 spectrum, there is one domain that is isolated to a particular grade level. What is that domain and in what grade level does it appear? What implications does this suggest to you with reference to instruction?

Sample Response:
- Counting and Cardinality in kindergarten
- Since C & C is restricted to kindergarten as a domain, the goal of instruction is to have this content securely mastered by the majority of students by the end of the year. First grade content builds on the premise that all students will understand the basic relationship between quantity and number. The CCSS require that teachers focus on the content that “belongs” to their grade level. While it is true that some students may require remediation, the number should be limited due to the narrowing of the scope of content and the depth of understanding required at each grade level.
6. *Cluster Headings* are bolded within the CCSS document. They describe smaller groups of related standards, *clusters*, within a domain. **List the three cluster headings in the domain of Operations and Algebraic Thinking for grade 4.**

Sample Response:
- Use the four operations with whole numbers to solve problems.
- Gain familiarity with factors and multiples.
- Generate and analyze patterns.

7. The *standards* describe what students should know and be able to do. In order to facilitate communication around the standards, a code has been developed. **What can you say about the standard that is coded as 1.NBT.3?**

Sample Response:
- It appears in the first grade under the domain of “Number and Operations in Base Ten”.
- It belongs to the cluster “Understand Place Value”.
- It is standard number three and reads, “Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.”

8. On page 37 of the Common Core State Standards, locate the standard typed below. **How would you code this standard?**

   3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
   a. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.

Sample Response: 5.MD.3a

9. Locate the cluster heading under 3.NBT. **Discuss the instructional significance of the footnote.**

Sample Response:
- All standards in this cluster heading are impacted by the footnote.
- Students have a variety of means open to them to demonstrate mastery of these standards. Mastery of a specific algorithm is not indicated at this point.