

Creativity and Common Core Mathematics

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As we grapple with the new expectations of the Common Core State Standards in Mathematics (CCSS-M), an understanding of how we create learning experiences for gifted learners aligned to these standards must also be addressed. The argument has been presented that the intrinsic structure of the standards provides an opportunity for depth and complexity in mathematics. For example, there is an emphasis in coherence created by big ideas in mathematics known as clusters (i.e. 5th grade cluster – Analyze patterns and relationships). Additional dimensions of gifted instruction, namely acceleration, are addressed in the CDE mathematics framework at the secondary level in curriculum compacting matrices. What is often overlooked, however, is the concept of creativity and the common core.

Creativity suggests the construction of a new mathematical concept or approach generated from a familiar scenario. Standard for Mathematical Practice 4 - Modeling provides just the venue for creativity to flourish. Mathematical model is highly dependent upon student generated questions, selected solution pathways, and individualized ways to report their findings. The scenario to be investigated is often not predetermined and is governed by student creativity. Students choose the context that is worthy of investigation. Modeling situations do not come with prescribed directions or steps. Students create models that represent the mathematical relationships inherent in a scenario.

Scenario Example: A student decides to sell lemonade on a hot summer day.

The student determines that which is worthy of investigation and creates his/her own questions to solve. Questions are often omitted from modeling tasks. Student may create possible questions to explore such as:

- 1) What price should each cup of lemonade costs? Factors to consider: costs of resources (cups, sugar, lemons, etc).**
- 2) What rate do I need to sell the cups of lemonade? Factors to consider: start time, end time, selling goal**
- 3) What is the ratio of sugar to water to lemons to create the perfect lemonade mixture? Factors to consider: sweetness, brand name lemonade top sellers**
- 4) When will I break even? Factors to consider: costs vs. revenue**

Once the students create the question(s), they then create relationships that represents all the given constants and variables in the situation. This can be represented in multiple ways – geometric, algebraic, graphic representations.

Example: Profit = Revenue - Cost

Profit = .50 x - 15.50 where x represents the number of cups of lemonade sold

Through mathematical modeling, students perform operations using their model and draw conclusions to determine whether or not their formulated model best represents the situation. They then check the reasonableness of their results and present their findings to others.

Developing a mathematical construct to represent a real world situation draws upon a student's ability to see creativity in mathematics. Provide opportunities for students to choose the context/scenario to be explored and let them draft the questions that will govern that exploration. Opportunities to explore mathematics with reduced scaffolds and limitations promote student curiosity which often leads to unique and novel ways to solve math problems, the essence of common core mathematics.