

Mathematics In Context

Motivating Students to *DO* Mathematics

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What *IS* Mathematics?

- Individually, complete the Nature of Mathematics Survey
- Score your survey by using the key...

Key			
<i>Views on the Nature of Mathematics Survey for Teachers of Mathematics</i>			
1. 1, 2, 3, 4, 5	2. 5, 4, 3, 2, 1	3. 1, 2, 3, 4, 5	4. 1, 2, 3, 4, 5
5. 5, 4, 3, 2, 1	6. 5, 4, 3, 2, 1	7. 1, 2, 3, 4, 5	8. 1, 2, 3, 4, 5

If the average score is 4 – 5, then the person has a more applied (fallibilist) view of the nature of mathematics.
If the average score is 3, then the person has an overlapping view of the nature of mathematics.
If the average score is 1 – 2, then the person has a more pure (absolutist) view of the nature of mathematics.

What *IS* Mathematics?

- Four corners – move to a corner of the room according to your score on the NOM
 - 1-1.9
 - 2-2.9
 - 3-3.9
 - 4-5
- Choose one item from the NOM and explain why your group selected the circle they did (as a group)

What *IS* Mathematics?

- There is no right or wrong view, but students need a balance.
- The purpose of this workshop is place students in a problem solving context where they have the opportunity to apply and understand the mathematics they are learning.

What Do Students Think?

Student Views About Mathematics

- When void of context, mathematics seems meaningless and ability to make a strong cognitive connection is jeopardized (Yusof & Tall, 1999)
- Students believe math problems are solved quickly or not at all (Schoenfeld, 1989)
- Students view math as a collection of rules, facts, skills, algorithms that need to be memorized (Carlson, 1997, Schoenfeld, 1985)
- Students report experiencing negative mathematical attitudes and anxiety and they blame past teachers for their dislike of math (Walmsley, 2000)

What Do Students Think?

Why are Student Views Important?

- Student views influence success in math class and determine how far they will take their math careers (Carlson, 1999, Clarke, 1992, McLeod, 1992)
- Student views have been associated with successfully using math to solve problems (Schoenfeld, 1985)
- Student negative views affect their motivation to do mathematics (Ponte, 1994, Kloosterman, 1994)
- While working on contextual situations, students are motivated to work through symbolic manipulations (Yusof & Tall, 1999)

What Can Be Done To Motivate Students?

Innovative Writing Projects

Video

Video

- Cal Clulus: In Pursuit of Justice
- Rule Time: Salute to Speed
- Rule Time: Salute to Brakes
- Rule Time: Salute to Sports
- Rule Time: Salute to Flight
- The Power of the Exponent



Motivating Math Problems????

- Solve the equation: $-16t^2 + 35t + 515 = 0$
- An object is tossed upward from a height of 515 feet at an initial velocity of 35 feet per second. Given that the height of the object at any time t is given by

$$h(t) = -16t^2 + v_0t + h_0,$$

find when the object hit the ground.

Survivor: Australia

- Read the letter from the “Survivors”
- Discuss a strategy for solving the problem
- Read student samples

Rule Time: Salute to Flight

- Why does $h(t) = -16t^2 + v_0t + h_0$?
- Can algebra students understand?
- Goes beyond just “getting an answer”.
- Students are motivated to solve problems when they come in motivating contexts such as writing projects and videos.

Final Thought

All teachers are excellent in the teaching and procedures. Their methods are tried and true. They teach procedures much the same as the way that they were taught. Their methods are flawless. It is the teaching and assessing of concepts that is at the forefront of the changes in mathematics education. It is the strategies for teaching and assessing concepts that we as teachers need to consider and develop so that we teach and assess concepts as well as we teach and assess procedures.

-NCTM