

# Motivating students with the “whys” in mathematics

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# About me

- B.S. – Mathematics (education – MSUM)
- M.S. – Mathematics (Purdue)
- Ph.D. – Mathematics education (Purdue)
- North Dakota State University
  - Mathematics
  - Teacher Education
- University of Nebraska Omaha
  - Mathematics
  - Haddix Community Chair of Math Education

# Why the “whys”

- Taught very traditionally for years
  - Positive teaching evaluations
  - High grade averages
- Attended R.L. Moore Conference 2008
  - Wondered if teaching could be better
  - Tried out new methods in two courses
  - Tried out new methods recently in summer workshops for teachers and calculus

# Success!

- Very high grades
  - Over 50% of my Calculus II class is earning an 'A'
- High level of conceptual understanding
  - Common core mathematical practices
- Mathematical conversation is phenomenal
- Collaborative nature to the classroom
  - Inside and outside of the classroom

# Today

- Have you try sample questions
- Have you create sample questions
- Have you discuss what is different about this approach

# Purpose

- Make you think
- Make you think like a student
- Make you think like a teacher
- To learn some math
- To have fun!

# Themed groups...

- Getting to know each other is key.
- Providing one example
  - See if you can think of other ways to create themed groups.

Group by...

## who is most injury prone...



### *Point system*

- **1 point** per strain, sprain, set of stitches, injury requiring multiple applications of ice packs, or similar mishap
- **2 points** per break; torn ligament, ACL or muscle; concussion; or similar mishap



# A WUWT Sequence

- STEP 1: Do the math. Understand *why* from a mathematical perspective.
- STEP 2: Understand why this is a puzzle for students. What's counterintuitive about it? Or why does it, at least on the surface, seem to not make sense?
- STEP 3: Develop pedagogical approaches. What can you do to help students sort this out? Please note: a demonstration is *only one* way to do this, and may not require of students the kind of wrestling and sense making that's needed.

# Create your own WUWT Sequence

- Create the sequence and solve the “puzzle”

Link it in to other/bigger ideas



# Questions / Comments?

