

# Equitable Teaching Practices in Math (and other STEM) courses: a work in progress

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# Equitable Teaching (EqT) Practices in Math

From Aguirre/Mayfield-Ingram/Martin, *Impact of Identity in K-8 Mathematics: Rethinking Equity-Based Practices (2013)*

1. Go deep with mathematics.
  - Analyzing, Comparing, Justifying—not just rote procedures
  - Tasks that have high cognitive demand & multiple solution strategies
2. Leverage multiple mathematical competencies.
  - Tasks with multiple entry points
3. Affirm mathematics learners' identities.
  - Team/Groupwork helps students see multifaceted skills, identity as someone who can do math
4. Challenge spaces of marginality.
  - Students who don't thrive in a lecture/individual-work setting have been marginalized.
5. Draw on multiple resources of knowledge (math, culture, language, family, community).
  - Knowledge about what is important in life; examples from many majors

# Lists of EqT Practices and Assessments

- [Aguirre/Mayfield-Ingram/Martin](#) (list of 5, just discussed)
- [State of Michigan Math Teacher Prep Standards](#) / AMTE (list of 7)
- [Bartell et al. 2017](#) (list of 9)
- ["A Resource for Equitable Classroom Practices", Montgomery County, Maryland, 2010](#) (list of 27)

## Assessments:

- [EQUIP protocol](#)
- [MCOPP+Equity](#)
- [X-PIPS-M](#)

# Goals for How Classes Work

(from [\*5 Practices for Orchestrating Productive Mathematics Discussions\*](#))

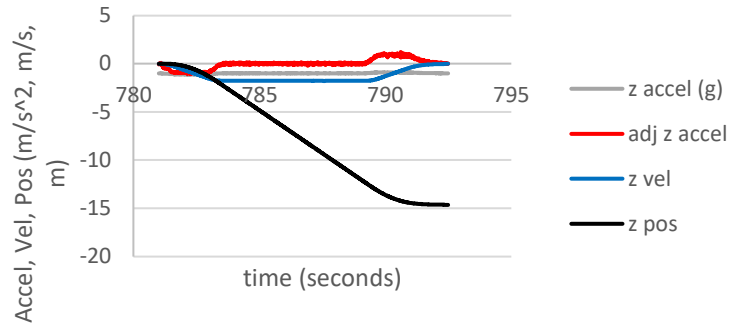
- Start with an open-ended, interesting, discussion-worthy applied task
  - Hopefully, multiple solution paths
  - Low-floor, high-ceiling
- Then Small group work.
  - Assign roles in group (facilitator, team captain, recorder or reporter, resource manager) to avoid defaulting to socially-stereotyped roles
- Then Whole-group discussion
  - Some groups present their work in an order selected by the instructor

Published tasks tend to have no obvious important motivation

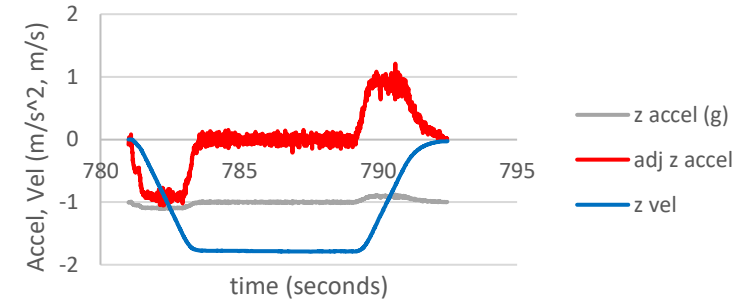
- Either no application at all, or an application that doesn't excite.
- Trying to collect Calculus applications from across STEM—email me ideas!

# Other Ideas

Elevator Acceleration, velocity, Position



Elevator Acceleration, velocity



- Can we turn it into “Solving STEM problems with Calculus”?
- Include a lot of Differential Equations solved the fun & easy way (in spreadsheets or Python)
- Include some systems involving Control (an external input trying to make the system behave how we want it to), the E in STEM.
- Don't be afraid of multivariate systems
- Mastery-Based Learning for part of the course grade?
- Projects (send me ideas!)
  - Some where the whole class does the same project
    - blood sugar control simulation; elevator acceleration/tracking
  - At least one student-chosen, likely in teams of 2 if possible; one round of revisions?

Simulated Blood Sugar and Insulin vs Time

