

# A View Into Secondary Education Mathematics

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# Project Introduction

- Who am I?
- Why this topic.
- Overview of project.



# Basis For Project

- National Council of Teachers of Mathematics' (NCTM):
  - Guiding principles for school mathematics.
  - Five strands to define learning mathematics.
  - Eight practices that promote a conceptual understanding.
- Fenstermacher, Soltis, and Sanger's Approaches to Teaching
  - Executive Approach
  - Facilitator Approach
  - Judicial Approach



# NCTM's Guiding Principles for School Mathematics

- Teaching and Learning
  - Through experiences, promote student's ability to make sense of mathematical ideas and reason mathematically.
  - Requires deep understanding of mathematics.
- Five strands that define learning mathematics
  - Developing a conceptual understanding.
  - Developing procedural fluency
  - Strategic competence
  - Using adaptive reasoning
  - Productive disposition



# NCTM's Building a Conceptual Understanding

- Establishing a mathematical goal to focus learning.
  - Make decisions based on class progress towards goals.
- Implement tasks to promote reasoning and problem solving.
  - High level and low level demanding tasks.
- The use and connection of mathematical representations.
  - Engaging students in making connections with representations to further deepen one's understanding.
- Facilitating meaningful mathematical discourse.
  - Anticipate, monitor, and assess.
- Posing purposeful questions.
  - Freeburn and Arbaugh's question types: Assessing questions, advancing questions, and judicious telling.
- Building procedural fluency and supporting productive struggle.
  - Overtime become skillful in using procedures flexibly.
  - Providing opportunities to engage and struggle in a topic.
- Elicit and use evidence of student thinking.
  - Using student thinking to assess progress towards mathematical understanding.



# NCTM's Guiding Principles for School Mathematics (2)

- Access and Equity
  - Teacher needs high expectations and bring the necessary support and resources for success.
  - Reflect, notice, and engage in the community.
  - Uncover biases in a classroom.
- Curriculum
  - Main goal is to develop connections between math and a student's world.
  - Planning out material, activities, etc.
- Tools and Technology
  - Resources designed to help students make sense of mathematics.
  - Can provide an easier way to grow.
  - Effective use increases the value.
- Assessment.
  - Four uses: Monitor students' progress, make decisions, evaluate students, and evaluate programs.
- Professionalism
  - Hold themselves and their colleagues accountable for success.
  - Professional isolation.



# Approaches to Teaching

Fenstermacher, Soltis, and Sanger's approaches to teaching

- Executive Approach
  - Straightforward, organized. Time management in the class.
  - “Just get the youngsters together, gain their attention, present a well-constructed lesson, and you could go home knowing that you did a day’s work well” (Fenstermacher, Soltis, and Sanger 2009)
- Facilitator Approach
  - High value on what students bring to classroom.
  - Facilitate the coming together of the world that a student brings to a school with the world the school seeks to bring the student.



# Approaches to Teaching (2)

- Liberationist Approach

- Views the teacher as one who frees and opens the minds of the learner.
- Nobody is free to dismiss anyone's knowledge.
- Show respect for differences between persons in the class while providing criticism in ways that assist students to improve without damaging their desire to keep trying.
- "Free the mind of dull, irrelevant facts."



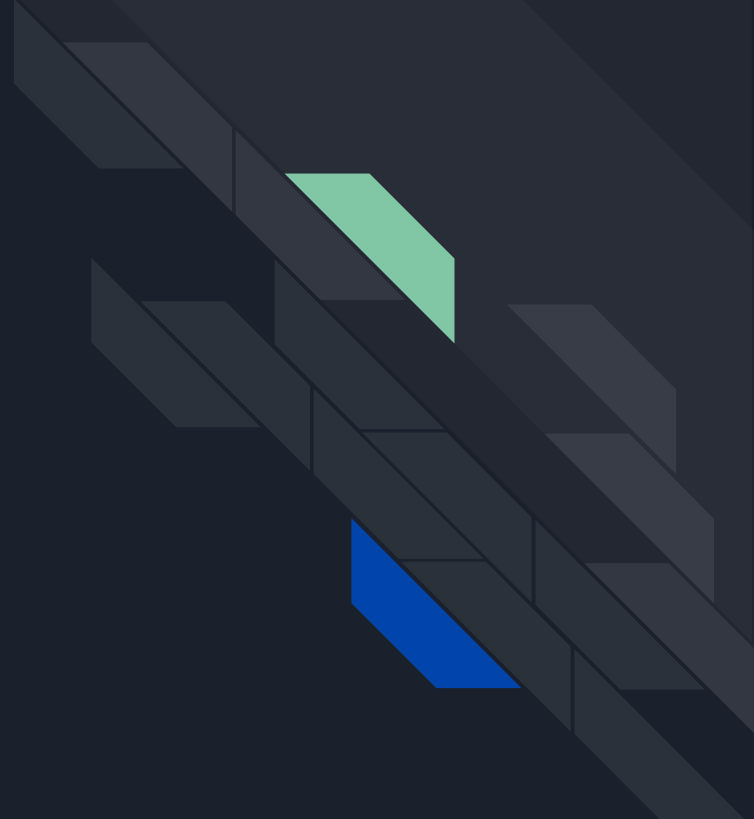


# Findings From Field Experience

- Classroom structure and style.
  - Differences between each class.
- Assessments and their role in the classroom.
  - How often are they and how are they used?
  - Problems with motivation with homework.
- Professionalism and curriculum.
  - Who decides what's going to be taught in the class?
  - Who does Mr. Gedert talk to for help? Who collaborates with him?
  - How is he responsible for other teachers and vice versa?
- Tools and Technology.
  - What tools are used in the class and when? Who are they used by?
- Discussions in the classroom.
  - How are they held? What structure is it? Differences between each class?
  - Is there a bias present in the class?
- Equity and Representation.
  - Context of the school and how representation works.

# Conclusion and Takeaway

- Teaching can end up as a 'pick your poison' type of situation.
- Philosophy with students.



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