

# A Math Supervisor's Philosophy

Barbara Morrison

THE PROFESSIONAL STANDARDS for Teaching Mathematics invites teachers to engage in ongoing analysis and reflection of their teaching. This submission represents some of my thoughts and reflections as supervisor of mathematics for Calgary Catholic Schools over the past four years. It took time and exposure to professional reading for me to formulate a practical, working philosophy. NCTM publications and MCATA journals have been extremely useful. No philosophy can be developed in isolation. I am indebted to colleagues and supervisors in my district and to others across Canada. I am most grateful to classroom teachers, for it is through ongoing dialogue and observations of teaching practices that I have been able to ground my beliefs in practice.

## The Importance of Mathematics

I believe that mathematics is a foundation discipline that opens doors for opportunity and without which many doors are beginning to close. Mathematics must be clarified, as we are heavily affected by rapidly changing technologies.

- All students should have an opportunity to study and learn essential mathematics.
- Teachers need to communicate and model the importance of mathematics to students.

## Learning Mathematics

If we believe that knowledge is personally constructed, we will embody a vision of teaching in which students are actively involved

in *doing* and *thinking* about the mathematics they are learning. Students will communicate their thinking, formulate their own hypotheses and conjectures, and test them with teachers and students.

- Students will use concrete experiences and relevant problems to construct mathematical ideas, concepts and skills.
- Teachers will be facilitators, continually questioning, checking for understanding and monitoring learning as they assess students' progress.
- Using open-ended problem-solving tasks will allow students to work cooperatively to extend and enrich their learning.

## Mathematical Processes

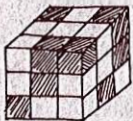
The NCTM Standards, *problem solving*, *reasoning* and *making connections*, will be part of a theory of learning used to develop and unveil mathematical skills, content and procedures. The fourth process Standard, *communication*, will enhance, enrich and create meaning.

- Polya's model will be viewed as a framework for student questioning and reflecting, looking back and looking ahead as they explore rich mathematical experiences. The statistical model of collecting or gathering data and organizing, analyzing and interpreting results will be embedded in most instructional activities.

Mathematical lessons will be varied when teachers internalize and use simple teaching frameworks and complement them with their own creative ideas. The following examples demonstrate great potential for employable structures.

AD 1975

Ernö Rubik patents  
Rubik's Cube (10<sup>19</sup>

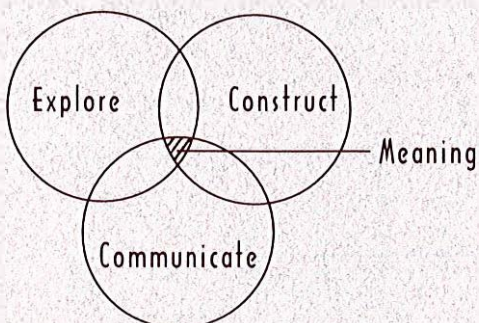


ways to  
scramble  
before  
solving).

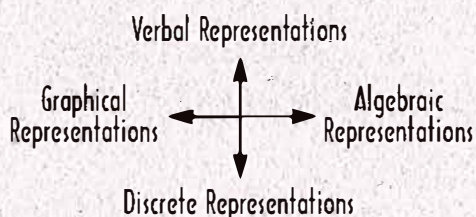


## Explore-Construct-Communicate

(Based on a meaning-making model used in the Language Arts Program of Studies)



## Model for Solving Worthwhile Mathematical Tasks



### Verbal Representations

A problem is presented to be clarified, understood and reformulated, or an investigation is used as students collect data through concrete activities. (Teachers will think about and then invent quality and relevant mathematical tasks that actively involve their students.)

### Discrete Representations

Students will gather data or problem information and organize it using tables, ordered pairs and so on.

### Graphical Representations

Students will select and use graphs or models.

### Algebraic Representations

Students will discover patterns, rules or generalizations and test them out.

(I call this the “leap of faith.” Everything depends on it. When teachers look within themselves, use their creativity and find hooks for their teaching, they will see change. Classrooms will become communities of learners. This is exciting.)

## Evaluation

Assessment of student progress and achievement will be fair and ongoing, formative, diagnostic and summative. It will be planned and aligned with instruction and clearly understood by students. There will be opportunities for self, group and peer assessment. Assessments will reflect important mathematical outcomes.

## Expectations

- Students will be expected to learn. They will come to school motivated and interested in learning. They will see purpose to learning mathematics and enjoy it.
- Classrooms will be communities of learners where the teacher’s role will be one of mentor and coach, director and facilitator, and caregiver.
- Teachers, parents and students will be jointly accountable and responsible for student learning.

My philosophy is not new. My challenge to you is to work together to simplify your beliefs and clarify your own philosophy. Communication and collaboration are vital. No doubt, your visions will also include the theory of learning reflected in the Standards documents. The next step is to ensure our teaching practices are grounded in our beliefs about students, mathematics and learning. We can then set realistic expectations for ourselves and our students. **Why settle for anything less?**

AD 1976

After 1000+ hours of calculation on a large electronic computer, mathematicians prove four colors are sufficient to color any map so that no two regions sharing a common border have the same color.