AlbertaRegionalConsortia

Problem Solving

"Students need to explore mathematics through solving problems ..." (pg. 2)

"The main goals of mathematics education are to prepare students to: ***solve problems****, etc."* (pg. 4)

"Students develop a true understanding of mathematical concepts and procedures when they solve problems in meaningful contexts." (pg. 8)

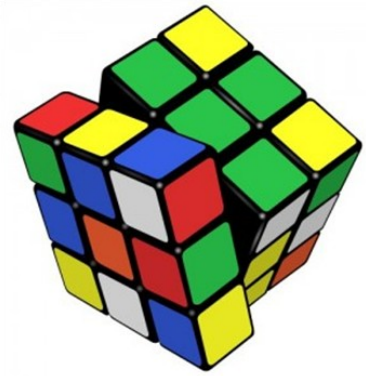
"If students have already been given ways to solve the problem, it is not a problem, but practice." (pg. 8)

"In a mathematics class, there are two distinct types of problem solving: solving contextual problems outside of mathematics and solving mathematical problems."

(The Alberta 10-12 Mathematics Programs of Study with Achievement Indicators 2008, Alberta Education)

Seven Mathematical Processes

- Communication
- Connections
- Mental Mathematics and Estimation
- **Problem Solving**
- Reasoning
- Technology



Thoughts on Problem Solving

If at all possible, try to facilitate problem solving by avoiding direct instruction and have students work on problems and investigations that guide them toward certain conclusions.

Have students working in small groups on the board to solve a problem in order to promote an environment of taking risks, asking questions and posing conjectures.

Investigations

The following examples ask students to look for patterns in order to draw conclusions and solve probelems.

- M10C Investigate Integer Exponents - Allow students to generalize the pattern and test their hypothesis.
- M10C Function Notation
- M10C Investigate Slope Intercept Form
- M20-2 Operations on Radicals

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Lesson Flow

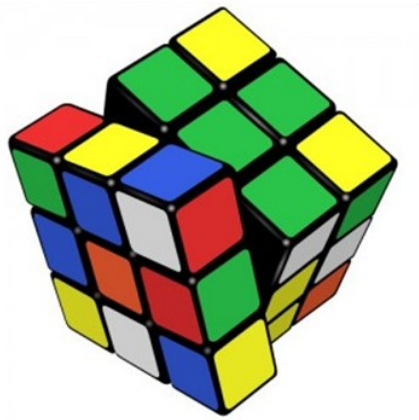
In the flow of the lesson, present a problem first and then debrief with the students afterward. It is amazing what solution methods students can come up with when presented with a problem. Their work can be a basis for discussion during the debrief when students formalize their solutions. By allowing students to struggle with solving a problem at the beginning, students are more invested in the problem and student engagement is increased.

M10C Speeding Car
M10C Choose a Wage
Double Stuffed Oreo

Dan Meyer has also proposed a method called 3 Acts to help engage students in problems. Find a description of 3 Acts here and examples here.

Applying Assignments

Applying Assignments are usually made up of problems that the students have not seen before and allow them to apply their skills. A description of Applying Assignments is available here.



For more information and additional supports for implementation, visit http://erlc.ca/resources/filter.php?theme=11&title=Mathematics